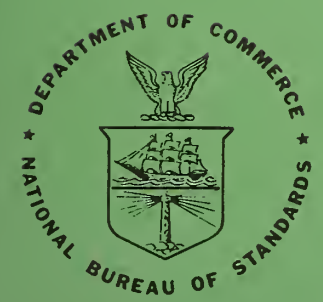
NBS TECHNICAL NOTE

440

DISCLOSURES ON:

Autoeditor—A Semi-Automatic Copy-Editing Apparatus



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UNITED STATES DEPARTMENT OF COMMERCE
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TECHNICAL NOTE 440

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DISCLOSURES ON:

Autoeditor—A Semi-Automatic Copy-Editing Apparatus

David Robbins, Editor

NBS Technical Notes are designed to supplement the Bureau's regular publications program. They provide a means for making available scientific data that are of transient or limited interest. Technical Notes may be listed or referred to in the open literature.

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This note is a disclosure on a semi-automatic apparatus for incorporating editorial revisions in narrative text using punched paper tape combined with mark-sensing techniques. Pencil marks placed on the original draft by the editor are sensed and arranged to automatically capitalize the first letter of a word, to capitalize an entire word, or stop the apparatus at the point where a change is to be made. Addition of text is entered manually with an electric typewriter; deletion of text is accomplished by activating a "mark skip" key which advances the tape without typing until the next control mark is sensed.

Other disclosures on various subjects may be found in NBS Technical Notes 237, 253, 263, 282, 287, 295, and 437.

Key Words:

narrative text editing, editorial mark sensing, automatic capitalization, automatic stop for revision, manual additions, automatic deletions, punched paper tape typewriter.

AUTOEDITOR—A SEMI-AUTOMATIC COPY-EDITING APPARATUS

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This publication describes a semi-automatic apparatus for incorporating editorial revisions in narrative text using punched paper tape combined with mark sensing techniques.

Pencil marks placed on the original draft by the editor are directly used by the apparatus to perform a variety of editing functions.

The system utilizes a console with three basic components:

1. A paper tape reader for the unedited input tape of the original manuscript;

2. A tape driven electric typewriter with tape punch and additional edit control keyboard; and

3. A unique tape controlled mark-sensing device referred to as a copy-follower. (This device has a typewriter-like movement for scanning the original manuscript to detect the presence of pencil control marks, while at the same time the typewriter, under control of the input tape, semi-automatically types the new manuscript.)

The sensing of the pencil control marks assist in the performance of the editorial functions indicated below:

1. Automatically capitalizes the first letter of a word;

2. Capitalizes an entire word; and

3. Automatically stops the reader and typewriter at the precise point where addition, deletion, or substitution of text is required after which:

   a. Addition of text accomplished manually with the electric typewriter; or

   b. Deletion is accomplished by activating a "mark skip" key which advances the tape without typing until the next control mark is detected by the copy-follower; or

   c. Substitution is accomplished by use of both a. and b. above.

In preparing a daily publication with this apparatus, text is received via teletypewriter and printed on tear sheets in all upper case characters. The tear sheets are encoded with editor and control marks and are then positioned in the copy-follower. The corresponding tape, received with the copy, is placed in the reader. The signals developed by the reader and copy-follower are used to control the electric typewriter semi-automatically, which enables an operator to prepare an offset master and a tape containing the corrections and shift codes.

Terminology and Notation

The following standard editorial marks are represented in the tear sheet in Fig. 2. Two horizontal lines under a letter indicate that the letter will be capitalized, while two lines under an entire word indicate that the word will be capitalized. When a letter is to be deleted and a new one inserted, a caret is placed before the deleted letter, a line is drawn through it, and the new letter is written above the caret. When a line is drawn through a word or phrase, the same will be omitted.

The mark-sense code shown in the figure is based on word increments. A vertical line or control mark drawn below a word denotes that the first letter of the following word will be capitalized, and two vertical lines or control marks below a word denotes that the system will stop at the end of that word.

When Figs. 6 to 15 are arranged as shown in Fig. 4, numbers ranging from 0 to 30 appear along the top and letters A and B appear in the right-hand margin of Fig. 6. This forms a coordinate system that may be used to locate the contacts of the relays in the figures. For example, relay 90 in Fig. 6 is associated with rectangle 90 in Fig. 5B which represents this relay and is divided into sections marked 28A, 29A, 13B, and 2A representing contacts 90-1, 90-2, 90-3, and 90-4 or contacts 1 to 4 of the relay, respectively. The notation in each section designates the location of the associated contact in the figures. Thus, to use the notation 28A to locate contacts 90-1, find the area between the numbers 28 and 29 along the top of Fig. 15 and proceed to the A or upper-half of this figure.

When a number appears in a rectangle and a P nearby, it represents the pick coil of a relay, the number of which appears in the rectangle. A pick coil is energized quickly and is used for operations that are not to be maintained for a long period of time. When a rectangle has an H nearby, it represents a coil used in a hold circuit for the relay whose number appears in the rectangle.

With reference to Fig. 3, the armature of contacts 180 is resting on the "normal" contact and, when actuated, engages the "transferred" contact. When the armature engages the transferred contact, the contacts are designated as "transferred contacts 180" and when the armature engages the normal contact, they are designated as "normally-closed contacts 180". Likewise, the armature of contacts 181 is resting on the "normally-closed" contact and when operated by the cam is transferred to the "normally-open" contact. When this armature engages the former contact, the contacts are designated as "normally-closed contacts 181," and when the armature engages the latter contact, they are designated as "normally-open contacts 181."

Some of the terminals in the figures are represented by the number of the terminal over a coordinate, for example, 1/6A in Fig. 6. This indicates that terminal 1 is connected to a terminal marked 1 over a coordinate, which may be found at 6A.

Block Diagram (Fig. 1) and Photograph (Fig. 1A)

A prototype of the copy-editing apparatus, as constructed and operated, is represented in the block diagram in Fig. 1 and is shown in the photograph in Fig. 1A.

With reference to the tear sheet in Fig. 2, since the word "TEXT" is to be omitted, keyboard 19 is used to position copy-follower 20 on the letter "C" in "CARIO". The sensing elements in the 5-channel reader 21 are positioned on the code combination for the same letter in the tape punched when the copy was received, and the automatic typewriter 22 is used to indent the offset master. The operator then depresses the cap-start key 23 on the auto-edit keyboard 24, and a signal is transmitted to circuit 26, which conditions the typewriter to capitalize the first letter of the next word sensed by reader 21. Circuit 26 transmits a signal to circuit 27 to start the reader. The output of the reader in the form of a 5-unit code is applied to code converter 28 where it is translated to an 8-unit code that controls typewriter 22. Thus, the code combination for the letter "C" is read out of the tape in reader 21, is translated to an 8-unit code and is applied to the typewriter. The typewriter, under control of circuit 26, is shifted into upper case and after it prints "C" on the offset master is automatically shifted to lower case, ready for the next letter.

At the same time code converter 28 transmits a signal to copy-follower 20 which causes the mark-sense head in the follower to space one character. The head senses the vertical line or control mark under the letter "C" and transmits a signal to the circuit 26 to condition the latter circuit for operation. The reader 21 continues to sense the codes punched in the 5-unit tape and typewriter 22 prints the letters in lower case until the word "Cario" is printed on the offset master. The same word is punched in the 8-channel edited output tape produced by the typewriter.

At the end of every word reader 21 will sense a code for either a space, hyphen or line feed. When any of these codes is transmitted to converter 28, a signal is generated and applied to circuit 26. When this circuit has been conditioned for operation as described just above, the latter signal will cause typewriter 22 to capitalize the first letter in the next word encountered.

Returning to our example, circuit 26 is conditioned by the control mark occurring under "CARIO" and is operated by the hyphens between "CARIO" and "UNDER" to cause typewriter 22 to capitalize the letter "U" in the latter word. The typewriter is then automatically placed in lower case and continues to print the remainder of the word "under" followed by "the title". The vertical line under "T" in "TITLE" controls the typewriter to capitalize the "T" in the word "The" printed on the offset master.

In the copy on the tear sheet, two control marks are positioned under "THE" since the word "MINISTEG'S" contains a typographical error. The mark-sense head in copy-follower 20 senses these marks and transmits a signal to stop circuit 31, which conditions the latter circuit for operation. At the end of the word "THE," converter 28 receives the code for space and responds by sending a signal to circuit 31 which causes reader 21 to stop. The operator may now use typewriter 22 to type the word "Minister's," one character at a time so that the corrected word is printed on the offset master. The word-skip button 32 is then depressed to activate skip-control circuit 33 which in turn operates control circuit 27 to turn on reader 21. The skip-control circuit also turns off typewriter 22. This operation continues until a space code is sensed by the reader and applied to converter 28 where a signal is generated to operate circuit 31 to stop reader 21. (The system would have responded in the same way had the reader sensed the code for either a hyphen or line feed.) At this point, the system has spaced over the codes in the tape representing the misspelled word without printing anything on the offset master.

As an alternate method for correcting the misspelled word in the above example, after reader 21 has stopped the operator may manually depress the shift key on typewriter 22 and then the character-print key 36 on keyboard 24. Key 36 applies a signal to control circuit 27 so that reader 21 senses one code in the tape and the typewriter prints the letter "M" on the offset master. The operator now releases the shift key to place the typewriter in lower case and depresses the character-print key for each remaining letter in the word "MINISTEG'S" until she arrives at the letter in error, i.e., "G". She then strikes the key for the small "r" on the typewriter to print this letter on the offset master. The operator then strikes character-skip key 44 to apply a signal to control circuit 33. The latter circuit activates 27 to turn on reader 21 which will stay on until code converter 28 recognizes a code that will space copy-follower 20 and will generate a signal that is applied to stop circuit 31 to turn off the reader. The operator then depresses a character-print key 36 and the appropriate keys on typewriter 22 to complete the word "minister"s" on the offset master.

In the Baudot code there are seven punctuation codes. To print the punctuation marks that relate to these codes, automatic typewriter 22 must be first placed in upper case and after the mark has been printed the typewriter must be placed in lower case. As an example, consider the apostrophe ('). When channel reader 21 reads the code for this punctuation mark, converter 28 generates a signal that is applied through circuit 31 to stop reader 21. Instead of transmitting the code for the apostrophe to the typewriter, the code converter stores the code in upper-case code circuit 59. When this occurs, the latter circuit generates a signal that shifts typewriter 22 into upper case. After the completion of this operation, the code stored in circuit 59 is fed to the typewriter which then types the apostrophe ('). Circuit 59 then generates a signal that causes typewriter 22 to downshift and generates a restart signal that is applied to reader 21.

Returning to our example, since the first letter in the next word on the tear sheet is to be capitalized, the cap-start key 23 is depressed and the system is started in operation in the manner previously described to print "Romances and" on the offset master. If the next word had not been capitalized in the first mode of operation above, the operator would have depressed the start key 45 immediately after the misspelled word had been corrected. In the second mode of operation, she would have depressed the start key after the apostrophe in the word "Minister's".

At the end of the line in tear sheet terminating in the word "AND," channel reader 21 reads a carriage-return code in the 5-unit tape. The code is applied to converter 28 which sends a signal to circuit 31 to stop the reader and another signal to typewriter 22 to space the typewriter carriage. The converter also sends a signal to copy-follower 20 which causes the copy-follower to move its mark-sense head away from its platen and effects a return and line feed of the pedestal-carriage on which the mark-sense head is located. After the return of the pedestal-carriage the copy-follower generates a signal that is fed to control circuit 27 to restart reader 21. The reader then recognizes another carriage-return code which provides the copy-follower with another line feed, even though the pedestial-carriage is in its initial position, and which stops and then restarts reader 21 in the same manner as when the first carriage return code was sensed. The second carriage-return code, however, will not effect a spacing operation in typewriter 22. In the course of the next read cycle, a line-feed code is encountered by reader 21. This causes the mark-sense head to be placed against the tear sheet and reader 21 to be placed in automatic operation.

The words "the Government Crisis," are now automatically typed on the offset master under restraint of the control marks on the tear sheet.

The offset master contains a justification area defined by a tab on typewriter 22. When the typewriter carriage is in this area, the tab causes a signal to be generated that is applied to justification circuit 46, conditioning the circuit for operation. When converter 28 senses the next carriage-return or space code, the justification circuit is operated and transmits a signal through circuit 31 to stop reader 21. The justification circuit generates another signal which is applied to typewriter 22 to effect a carriage return. At the conclusion of the carriage return, the typewriter provides a signal that is fed to control circuit 27 to restart the reader 21.

The justification circuit 46 includes an arrangement for insuring that only planned indentations occur on the offset master.

Continuing our example, assume that as the word "Crisis" is being printed on the offset master and the carriage of the typewriter enter the justification area. The justification circuit 46 will then be conditioned for operation, and in response to the space that occurs after the quotation mark (") is typed, the typewriter would normally effect a carriage return. In this case, however, since two vertical lines are located under "CRISIS" on the tear sheet, the system stops after the latter quotation mark has been printed.

EL-FINOPRESS, under our definition, comprises two words on the tear sheet because of the hyphen between the L and F. As indicated by the horizontal lines beneath them, these words are to be capitalized. To accomplish this, the operator depresses the word-cap key 40 to activate word-cap circuit 41. The latter circuit then causes typewriter 22 to shift to upper case and conditions stop circuit 31 for operation. Circuit 41 also applies a signal to 27 to start reader 21. The reader senses the codes for the two letters that comprise the first word which is then printed in upper case on the offset master. When the reader senses the code for the hyphen, converter 28 generates a signal that operates circuit 31 to stop the reader. The operator now depresses key 40 and the process just described is repeated for the second word. After reader 21 reads the space code appearing after the code for the letter "S," converter 28 develops a signal that causes the reader to stop.

The operator now strikes start key 45 which applies a signal to control circuit 27 to restart reader 21. After the reader is restarted, the system continues to operate in the fashion described above under control of the mark-sense code on the tear sheet until the two control marks are encountered under "RESULT".

In the present arrangement two control marks may be positioned beneath a character combination only if it contains three or more characters. Since the information to be deleted now is preceded by a two-letter word, "OF," the two control marks are placed under the preceding word, "RESULT," which stops reader 21 after the latter word has been printed on the offset master. The word "of" must however be printed on the offset master. This is accomplished when the operator depresses space-prompter key 52 which applies a signal to stop gate 53 and conditions the gate for operation. Key 45 is then depressed to start reader 21 which senses the codes for the next word. When the code converter 28 recognizes the code for a space, line feed or hyphen, it applies a signal to stop gate 53 which then operates circuit 31 to stop the reader and, in effect, the system. The result is that the reader is started, the codes for the word "OF" are sensed, the word is typed in lower case on the offset master and the system is stopped. Space-prompter key 52 is then returned manually to its normal position.

The mark-skip key 56 is now struck to energize skip-control circuit 33. This starts reader 21 and turns off typewriter 22. The reader will continue to sense the 5-unit tape and operate the copy-follower 20 through code converter 28 until the copy-follower senses the control mark under "4". The copy-follower then applies a signal to skip-control circuit 33 which conditions circuit 33 for operation. When converter 28 receives the next code for a space, it transmits a signal that operates circuit 33, which stops reader 21 through circuit 31. This operation would also have occurred if the converter had received a hyphen or line-feed code.

Start key 45 is now struck to turn on reader 21 which then reads the codes for carriage return twice, line feed, "GENERAL ELECTIONS" and a period (.). This will cause the pedestal-carriage on copy-follower 20 to return to its initial position, effect a double space and will also operate typewriter 22 to print "general election" on the offset master.

After reader 21 reads the 5-unit code that represents the period (.), (the same operation would be performed in response to the code for a question mark or an exclamation point) code converter 28 applies a signal to cap-after-sentence circuit 50. This conditions 50 for operation. The reader continues until it encounters a space code (the line-feed or hyphen code would achieve the same result) when the converter generates another signal that operates circuit 50. At the same time code converter 28 generates a signal that is applied to stop circuit 31, turning off the automatic operation of reader 21. When circuit 50 is operated, it shifts typewriter 22 into upper case and starts a cap-first-letter-next-word routine. During this routine, the letter "I" in the word "IN" on the tear sheet is capitalized on the offset master, the typewriter is shifted to lower case, and reader 21 is placed in automatic operation.

The reader now continues to read the 5-unit tape, and under control of code converter 28 and copy-follower 20, the typewriter 22 prints the remaining portion of the copy shown in Fig. 2.

Copy-Follower Keyboard

The copy-follower 20 comprises an IBM Selectric Typewriter with its keyboard removed. In place of the type-ball, the pedestal is equipped with sensing brushes. The typewriter is provided with keyboard 19 and with related circuits that control the indexing and return of the pedestal-carriage as well as the positioning of the brushes against and away from the platen. The keyboard includes brush key 221, carriage-return key 222 and indexing key 223, whose functions are described below. It will be apparent that other arrangements could be used and the one just set forth is not necessarily the best for copy-follower 20.

At the start of operation, the operator strikes key 221 (Fig. 12) to energize brush solenoid 211. When 211 is energized, it operates a mechanical latch which allows a shaft (not shown) to revolve one revolution. During this revolution, the pedestal is positioned so that brushes 205 (Fig. 13) are removed from the platen. The operator then positions the tear sheet in the carriage of copy-follower 20 and strikes carriage-return key 222 to activate solenoid 212. This returns the pedestal-carriage to its initial position. The operator then strikes key 221 to re-energize solenoid 211. When the solenoid is energized again, the mechanical latch is released to permit another revolution of the shaft. During this revolution the pedestal is positioned so that brushes 205 are placed against the tear sheet. The operator then uses index key 223 (Fig. 11), which controls solenoid 210, to index the pedestal-carriage until the brushes are registered on the starting character in the tear sheet.

If the first character on the tear sheet is a letter, the operator depresses a letters key (not shown) which places typewriter 22 in letters-shift operation. Conversely, if the first character is a figure, the operator depresses a figures-key (not shown), placing the typewriter in figure-shift operation.

Finally, the reset key (not shown) is struck to reset all relays in the drawings to their normal positions. This assures that the system is in a restart position.

Code Converter

Code converter 28 (Fig. 1) comprises a relay matrix, including relays 7 to 60 (not shown), which are used to convert from a 5-unit to an 8-unit code. Some of these relays are provided with additional contacts that are illustrated in the figures to obtain the functions indicated below.

Copy-Follower Index

Whenever a code, that would require copy-follower 20 to be spaced, is sensed by reader 21 a potential is developed in converter 28 that energizes one of the relays 7, 8, 10 to 17, 19 to 56, 59, or 60 (not shown) and the relay closes its highest numbered contact. (These contacts are represented by contacts 7-4, 8-4...59-6, and 60-4 in Fig. 11.) The closed contact cooperates with timing contacts CB-5, when the latter are operated by the main timing shaft for the period shown in Fig. 16, to complete a circuit that energizes index solenoid 210 and advances copy-follower 20 one step.

Stop-Code

When a stop code is encountered by reader 21, relay 6 is energized and contacts 6-4 (Fig. 11) are opened. This will de-energize relay 68, as will be apparent from the material below, so that contacts 68-2 open the circuit to the main clutch coil 202 and reader 21 stops.

Cap-First-Letter-Next-Word

One of three routines may be used to capitalize the first letter of the next word on the tear sheet. In the first, the cap-start key 23 is depressed. Typewriter 22 is then shifted into upper case and reader 21 is advanced one code at a time until it reads a letter code. The letter related to the code is punched in the 8-unit tape and typed on the offset master by typewriter 22 which is then downshifted. At the end of this operation, a start pulse is generated to place the reader in automatic run operation.

In the second, a control mark is placed in a first read-area on the tear sheet under the word preceding the one whose first letter is to be capitalized. When the control mark is sensed by copy-follower 20 a routine is set up to capitalize the letter and is executed after a space, hyphen or line-feed code is read by reader 21. (As set forth below under "Stop-After Word" the control mark must be positioned in a first read-area defined by the space preceding the first character and the first two characters of a word.)

In the third routine, the first letter of the next word is automatically capitalized when reader 21 reads the code for an exclamation point, question mark, or period at the end of a sentence.

The three routines are described in detail in Sections A, B, and C below.

A. When cap-start key 23 (Fig. 6) is depressed, a circuit is completed through contacts 182, 183, and 184 on typewriter 22, contacts 91-2, 23A and relay 87 to positive potential. This energizes the relay and a holding circuit is established over contacts 87-1 and 84-2. Since contacts 182, 183, or 184 are opened when typewriter 22 performs either a line-feed, carriage-return or backspace operation, respectively, if the typewriter is performing any of these operations when key 23 is struck, relay 87 will not be energized until the operation is completed.

When key 23 is released, its arm engages contact 23B and a circuit is completed via contacts 87-2, 88-2, and relay 77, which is picked up. Contacts 77-1 transfer to energize the auxiliary clutch coil 200 (Fig. 8) for the auxiliary timing shaft (not shown) which starts a revolution. Contacts 77-2 to 77-6 (Fig. 15) are closed and as timing contacts CB-11 (Fig. 14) are operated by the auxiliary shaft during the time interval represented in Fig. 16 a pulse is transmitted over the latter contacts to translator 227. The output of the translator shifts typewriter 22 into upper case.

When relay 87 is energized as indicated above, contacts 87-3 (Fig. 7) close. As timing contacts CB-13 (Fig. 7) are operated by the auxiliary shaft during the time interval indicated in Fig. 16 a pulse is generated that activates relay 88. Contacts 88-1 then close, establishing a holding circuit for this relay. Normally-closed contacts 88-2 open the circuit through relay 77 which drops out and the contacts associated with 77 open. Typewriter 22, however, remains in upper case until downshifted.

Reader 21 is started in the following manner. Normally-open contacts CB-14 and CB-15 (Fig. 8) are sequentially operated by the auxiliary shaft as represented in Fig. 16. When both contacts are closed a circuit is completed from the 0-volts bus through normally-closed contact 83-3, transferred contacts 87-4, terminals 1/1A and 1/6A and the coil 202 for the clutch of the main timing shaft which is not shown but is located in reader 21. This releases the clutch to allow the main shaft to make one complete revolution.

Relays 6 through 61 (not illustrated) are operated by suitable potentials obtained in code converter 28. Some of the contacts controlled by these relays are shown in the figures and will be explained in detail below.

Contacts 5-2, 6-5, 9-7, 12-7, 18-6, and 58-6 (Fig. 7) comprise the circuitry used in the search for a letter code. During the revolution of the main timing shaft noted above, a read cycle is effected and timing contacts CB-9 are operated so that the 0-volts bus is connected to the contacts just named. If the code encountered by reader 21 represents a letter-shift, contacts 5-2 transfer and a circuit is completed through closed contacts 88-3 (relay 88 is energized) to pick up relay 4. Contacts 4-1 make to establish a hold circuit through contacts 69-4. Contacts 4-2 (Fig. 6) close to complete a circuit that applies 0 volts through normally-closed contacts 91-2 to clutch coil 202 which causes the main timing shaft in reader 21 to make another revolution.

Contacts 250 (Fig. 11), which are located in reader 21, are operated for a period overlapping the time of operation of timing contacts CB-11 represented in Fig. 16. When CB-1 are operated during each read cycle relay 69 is energized. Thus, during the latter revolution of the main timing shaft as a read cycle is effected, relay 69 is picked up to open contacts 69-4, breaking the hold circuit for relay 4. Relay 69 drops out during the revolution, restoring contacts 69-4 to their normally-closed position.

Likewise, if a figure-shift code is sensed by reader 21, contacts 58-6 transfer and a circuit is completed through contacts 88-3 and relay 4 to start the operation just described. Similarly, contacts 6-5, 9-7, 12-7, and 18-6 will transfer when the stop code, carriage-return code, space code and line-feed code, respectively, are sensed by the reader and a circuit is completed via contacts 87-10 to relay 4. It follows that the reader will step one cycle at a time as long as any of these codes are sensed.

If the code sensed by reader 21 is not one of the above codes, it must be a letter code. When a letter code is sensed by reader 21 and timing contacts CB-9 are closed by the main timing shaft, a circuit is established via the normally-closed contacts connected in series with contacts 5-2 and via the closed contacts 87-6 (relay 87 is energized) to pick up relay 85. The letter code, that was just sensed, it applied to the code converter 28 to translator 227 to operate typewriter 22. The letter is then printed in upper case on the offset master and is punched in the 8-unit tape by the typewriter. During this operation contacts 87-8 (Fig. 15) are open to prevent a redundant upper-case code from being punched in the 8-unit tape. This would occur, as will be apparent from the description under "Punctuation Marks" below, when an upper-case punctuation mark precedes the letter to be capitalized.

When relay 85 is picked up, the typewriter is downshifted to lower case as will now be described in detail. Contacts 85-1 close a hold circuit for 85 through closed contacts 87-5 (relay 87 is energized)and at the same time contacts 85-10 close a circuit through contacts 87-7, 87-6, 85-1, and 87-5 to energize the clutch coil 200. This will effect one revolution of the auxiliary timing shaft. As the shaft rotates, timing contacts CB-11 (Fig. 14) make and a circuit is completed through transferred contacts 85-9 and lower case 85-3 to 85-7. This will apply zero potential to the translator 227 which downshifts the typewriter 22 and produces a lower-case code in the 8-unit tape.

During the revolution of the auxiliary shaft just described, time contacts CB-13 (Fig. 7) are closed for the time interval shown in Fig. 16 and a circuit is completed through closed contacts 85-2 to energize relay 84. This performs the following reset operations and places reader 21 in continuous operation. Contacts 84-2 (Fig. 7) open the hold circuit for relay 87 which then drops out. Contacts 87-5 (Fig. 8) open to de-energize relay 85. Finally, normally-closed contacts 84-3 (Fig. 7) open to drop out relay 88. When timing contacts CB-14 and CB-15 (Fig. 8) make, a circuit is set up through normally-closed contacts 83-3, 87-4, and terminals 11/16B, 11/6A to energize relay 68. A hold circuit for this relay is established through the normally-closed contacts in the bank that includes contacts 44-3 and the one that includes contact 6-4, through contacts 68-1 and start switch 45. Contacts 68-2 (Fig. 6) close to complete a circuit that energizes the clutch coil 202 for the main timing shaft and places reader 21 in automatic run operation.

B. The routine involving the control mark will now be presented. The control mark is made with a pencil containing graphite, conductive lead while the editor marks are made with a nonconductive lead so that the mark-sense circuit will respond to the control marks only.

When brushes 205 (Fig. 13) sense control mark 206 a circuit is completed to pick up relay 76. Contacts 76-1 close, completing a hold circuit for 76 that extends through closed contacts 93-1, terminals 14/11B, 14/21B and contacts 71-4, 18-5, 12-3, and 36-3 in the mark-reset line. Contacts 76-1 also complete a circuit from the mark-reset line through normally-closed contacts 94-3 to energize relay 96. Contacts 96-1 then create a hold circuit for 96.

As contacts 96-4 close a circuit to mark-reset line, relay 93 is activated which indicates that the brushes 205 have sensed a control mark in the first read-area under a word. Contacts 93-3 will now break the line between the 0-volts bus and brushes 206 and contacts 93-1 will open the hold circuit for relay 76, so that the mark-sensing circuit is inactivated.

When relay 96 is energized as noted above, contacts 96-3 are closed and during each read cycle the main timing shaft operates contacts CB-9 (Fig. 7) to send a pulse over the circuit that includes contacts 100-4, 110-2, 96-3, and 3-2. This pulse is applied to contacts 12-10, 18-7, and 36-5 which are operated when a space, line-feed, or hyphen code is read by reader 21. In the presence of one of these codes, the related contacts make and relay 87 is picked up, effecting the capitalization routine described in Section A. above.

Contacts 96-6 open to prevent the pulse generated by contacts CB-9 from activating relay 4 over 87-10 which precludes reader 21 from executing another read cycle at this point. This is done for the following reason. In the capitalization routine after relay 87 has been energized reader 21 is turned off and typewriter 22 is shifted into upper case. If relay 4 were not prevented from starting the reader while the typewriter is being shifted, the reader might read the code for the character to be printed while the typewriter was being shifted into upper case. The character would then be lost.

Since reader 21 in the present example is in automatic operation, relay 68 (Fig. 11) is activated. The hold circuit for 68 contains two parallel branches, the first starting with contacts 92-2 and the other 36-2. Both branches are tied through contacts 68-1 to start key 45. When relay 96 is energized as noted above, contacts 96-5 open, breaking one of the branches of this hold circuit, and when either a space, line-feed, or hyphen code is received one of the contacts 12-2, 18-4, or 36-2, respectively, open to break the other branch. Relay 68 will then drop out, contacts 68-2 will open, and clutch coil 202 will be de-energized so that reader 21 will stop. Further, when one of the foregoing codes is sensed by reader 21, one of the contacts 12-3, 18-5, or 36-3, respectively, in Fig. 9 will open the mark-reset line. This will cause relays 93 and 96 to drop out.

C. At the end of a sentence when either a code for an exclamation point, question mark, or period is sensed by reader 21 the cap-after-sentence circuit 50 is conditioned for operation. When a space, line-feed, or hyphen code is then encountered, the reader is stopped and the cap-first-letter-of-next-word routine is executed. After this routine is completed, reader 21 is placed in automatic operation.

Relays 44, 56, and 17 (not shown) are located in code converter 28 and are energized when the code for an exclamation point, question mark, or period, respectively, is read by reader 21. Either contacts 44-5, 56-5, or 17-10 (Fig. 10) are then closed to pick up relay 92. Contacts 92-1 then establish a hold circuit over terminals 26/11A, 26/12B, and the mark-reset line. Contacts 92-2 open one of the parallel branches in the hold circuit for relay 68 so that when a code for either a space, line-feed or hyphen is sensed by reader 21 during a read cycle, contacts 12-2, 18-4, or 36-2, respectively, open the other branch of the hold circuit. Relay 68 then drops out, contacts 68-2 break, and reader 21 is stopped. Simultaneously, either contacts 12-3, 18-5, or 36-3 (Fig. 9) in the mark-reset line open one branch of the hold circuit for relay 92. At the proper time in the read cycle timing contacts CB-6 open the other branch of the hold circuit that includes the mark-reset line and relay 92 is de-energized.

Before contacts CB-6 open to drop out relay 92, normally-open contacts CB-9 are operated (See Fig. 16) to send a pulse over transferred contacts 92-3 and either contacts 12-10, 18-7, or 36-5 (depending upon whether a space, line-feed or hyphen code was sensed) to operate relay 87. This will start the capitalization routine described above under Section A.

When relay 92 drops out, contacts 92-4 open to prevent the trailing edge of the pulse generated by CB-9 from energizing relay 4 through contacts 87-10, which in turn prevents reader 21 from executing another read cycle at this point. This is done for the following reason. In the capitalization routine after relay 87 has been energized reader 21 is turned off and typewriter 22 is shifted into upper case. If relay 4 is not precluded from starting the reader while the typewriter is being shifted, the reader might read the code for the character to be printed while the typewriter was being shifted into upper case. The character would then be lost.

When relay 87 drops out at the end of the capitalization routine contacts 87-4 transfer, and when contacts CB-14 and CB-15 are operated a pulse travels over terminals 11/16B and 11/6A to energize relay 68. This places reader 21 in automatic run operation.

Stop-After-Word

When two control marks are located under a word on the tear sheet a routine is established to stop reader 21 after a space, hyphen, or line-feed code is encountered by the reader, i.e., at the end of the word. To achieve this result, one of the marks must be positioned in a first read-area defined by the space preceding and the first two characters of the word, and the other must be positioned in a second read-area defined by the remaining portion of the word. A character is denominated as any code that will cause copy-follower 20 to index one position.

The start of the first read-area is delineated by a space or line-feed code. If a space or line-feed code is read by reader 21, contacts 12-11 or 18-8 make (Fig. 13). When contacts CB-9 (Fig. 7) close during the first read cycle in the time interval indicated in Fig. 16, a pulse is sent over terminals 9/22A, 9/6A and contacts 12-1 or 18-8 to energize relay 101P. Contacts 101-1 close to pick up relay coil 101H which forms a hold circuit for relay 101.

If the first control mark is now sensed, relay 76 is picked up and relays 96 and 93 (Fig. 13) are then energized. Contacts 93-1 open the circuit between brushes 205 and relay 96, while contacts 93-3 open the circuit between the 0-volts bus and the brushes. The mark-sense circuit is now inoperative and will remain so until relay 94 is activated in the manner set forth immediately below.

During the second read cycle, if a character is read by reader 21, when timing contacts CB-5 are operated (Fig. 11) a pulse is transmitted through one of the contacts noted by 7-4, 8-4...59-6, and 60-4, through terminals 18/24A, 18/15A and contacts 101-2 to energize relay coil 102P. (Simultaneously, copy-follower 20 is indexed as described previously under "Copy-Follower Index.") Contacts 102-1 close, energizing relay coil 102H to establish a hold circuit for relay 102. Contacts 102-3 close so that during this read cycle when timing contacts CB-9 are operated relay coil 107P is energized. Contacts 107-1 make to energize relay coil 107H which creates a hold circuit for relay 107. Contacts 107-3 open to drop out relay 101.

When relay coil 107 is energized during the second read cycle, contacts 107-2 close and relay coil 108P is activated. Contacts 108-1 establish a hold circuit for relay 108 by energizing relay coil 108H. Contacts 108-2 make so that the pulse generated by timing contacts CB-9 during the third read cycle is sent over contacts 108-2 to pick up relay coil 103P. Contacts 103-1 then establish a circuit through relay coil 103H, which forms a hold circuit for relay 103. Contacts 103-2 make and the pulse generated by contacts CB-5 during the fourth read cycle picks up relay coil 104P. The timing contacts CB-6 (Fig. 9) are then operated in the period noted in Fig. 16 to generate a pulse that is sent through terminals 19/22A, 19/9A and contacts 104-1 to pick up relay coil 104H, establishing a hold circuit for relay 104. During this read cycle contacts CB-9 transmit a pulse that picks up relay coil 94P through terminals 9/22A, 9/6A, contacts 104-2 and transferred contacts 96-2. (Relay 96 is energized.) Contacts 94-1 then close a hold circuit for relay 94 that extends through the mark-reset line and includes relay coil 94H. Now that relay 94 is energized and held up contacts 94-2 and 94-4 make and condition the mark-sense circuit for operation. Contacts 94-5 open the hold circuits for relays 101 to 103, 107, and 108, and when the pulse generated by timing contacts CB-6 terminates relay 104 drops out.

Now assume that a mark in the second reading area is read by brushes 205. Relay 76 will be energized and contacts 76-1 will close to establish a hold circuit for relay 76 via the mark-reset line. When timing contacts CB-6 are operated by the main timing shaft, a pulse is transmitted over terminals 19/22A, 19/9A, contacts 76-1, and transferred contacts 94-3. (Relay 94 is energized.) This pulse activates relay 95. Contacts 95-1 then establish a hold circuit for 95 by way of the mark-reset line. Contacts 95-2 close to pick up relay 114 which opens contacts 114-1. This breaks the circuit that extends through brushes 205 to relay 76, which drops out. Contacts 95-3 open the circuit to relay 87 to prevent the occurrence of the capitalization routine described above under "Cap-First-Letter-Next-Word."

Since a mark was sensed by brushes 205, relay 96 is energized and contacts 96-5 are open, breaking one branch in the hold circuit for relay 68. Thus when a space, line-feed or hyphen code is read by reader 21 at the termination of the word being read, either contacts 12-2, 18-4, or 36-2, respectively, open the other branch in the hold circuit for relay 68 which drops out. This causes contacts 68-2 to break the circuit for clutch coil 202 so that reader 21 is stopped. Again, when a space, line-feed or hyphen code is read, either contacts 12-3, 18-5, or 36-3 (Fig. 9) break the mark-reset line and relays 76, 94, 95, and 96 are de-energized.

It is noted that when a space code is read by reader 21, contacts 12-6 open so that a mark on the tear sheet cannot be sensed by brushes 205 in the area skipped by copy-follower 20 during the spacing operation.

When a space code is read by reader 21, contacts 12-11 close and contacts CB-9, when operated, develop a pulse that energizes relay coil 101P by way of terminals 9/22A and 9/6A. Contacts 101-2 close, relay coil 102P is energized and 102-2 close. If another space or line-feed code is sensed during the next read cycle, either contacts 12-11 or 18-8 transfer and relay 106 is activated by the next CB-9 pulse. Contacts 106-3 will then open to reset relays 101 to 103, 107 and 108. A hold circuit is established for relay 106 over contacts 106-1 so that 106 remains energized for the duration of the CB-9 pulse. At the same time coil 101P is picked up. In this way if more than one space code is read, only the last space code will be effective in operating the circuits just described.

If a mark is not sensed in the first read area, timing contacts CB-9 will send a pulse through contacts 104-2, which are closed after three characters are sensed by reader 21, and normally-closed contacts 96-2 to energize relay coil 105P. Contacts 105-1 establish a hold circuit that includes coil 105H for relay 105. Contacts 105-3 then open to reset relays 101 to 103, 107, and 108. Stated differently, if a control mark is not sensed in the first read area and two marks are sensed in the second, the system will operate as though only one mark were present and will capitalize, erroneously, the first letter of the next word. The editor therefore is instructed to position the first mark under the first letter of the word and is provided with the leeway of a space and letter position in locating the mark.

Word-Skip

When a word is spelled incorrectly on the tear sheet, two control marks are placed under the preceding word to stop reader 21. (See "Stop-After-Word" above.) After the reader stops the operator types the corrected word on the offset master and then strikes the word-skip key 32 to skip the misspelled word in the 5-unit tape sensed by 21 without operating typewriter 22.

When key 32 (Fig. 12) is depressed, contacts 32A make to energize relay 70. A hold circuit is created through contacts 70-1 terminals 15/11B, 15/21A and the mark-reset line. Contacts 70-2 (Fig. 14) and 70-3 (Fig. 15) open so that any pulse generated by contacts CB-3 and CB-11 can not energize translator 227 in typewriter 22. Contacts 70-4 open one of the parallel branches in the hold circuit for relay 68. This conditions the hold circuit so that it will drop out when the next space, line-feed, or hyphen code is read by reader 21 as described below.

Further when key 32 is depressed, relay 71 is energized by way of a circuit closed by normally-open contacts 32B. The hold circuit for 71 is established through contacts 71-2 and 69-3. Contacts 71-4 (Fig. 9) open to reset any relays energized through the mark-reset line.

After key 32 is released, a circuit is completed through normally-closed contacts 32B, terminals 21/17B, 21/21A, closed contacts 71-1 and the bank of contacts starting with 12-2 to energize relay 68. This will cause contacts 68-2 to complete a circuit that energizes clutch coil 202 and starts the main timing shaft of reader 21. During the first read cycle, contacts CB-1 and 250 (Fig. 11) are operated so that relay 69 is energized and contacts 69-3 open to drop out relay 71.

When relay 68 is energized as indicated above, contacts 68-1 establish a hold circuit for 68 and reader 21 is placed in automatic operation. However, since contacts 70-2 and 70-3 are open, translator 227 can not be operated and typewriter 22 will not print the information represented by the codes encountered by the reader. This operation continues until a space, line-feed or hyphen code is recognized by reader 21 when one of the contacts 12-2, 18-4, or 36-2, respectively, opens one of the parallel branches in the hold circuit for relay 68. Since relay 70 is energized, normally-closed contacts 70-4 open the other parallel branch in the hold circuit, and relay 68 drops out, which stops reader 21. The same code causes either contacts 12-3, 18-5, or 36-3 to open the mark-reset line in the hold circuit for relay 70, which is released. In this way the codes in the 5-unit tape for the misspelled word are skipped without recording the word on the offset master.

Character-Print and Character-Skip

When the operator elects to correct a misspelled word by handling one character of the word at a time, she depresses the character-print key 36 for each correct character which is then printed automatically on the offset master. Arriving at the incorrect character, the operator prints the correct one on the offset master and strikes the character-skip key 44 to skip the incorrect code in the 5-unit tape read by reader 21. She then depresses start key 45 to place the reader in automatic operation.

As typical example, if a word is misspelled on the tear sheet two control marks are placed under the preceding word so that reader 21 will stop after the codes for the latter word have been sensed. The operator then strikes the character-print key 36 (Fig. 6) to print the first character of the word to be corrected and a circuit is completed which energizes relay coil 99P. When the key is released, a circuit is completed through normally-closed contacts 44A and contacts 93-3, which were just closed, to the clutch coil 202. The clutch will then activate the main timing shaft, causing reader 21 to perform a read cycle.

As contacts 99-4 (Fig. 9) close, relay 100 is picked up and contacts 100-1 establish a hold circuit for this relay when contacts CB-6 are operated. Contacts 100-4 (Fig. 7) open to prevent the pulse generated by contacts CB-9 from restarting reader 21 as previously set forth under "Cap-First-Letter-Next-Word." Contacts 100-2 (Fig. 12) open, preventing relay 74 from being energized so that contacts 74-4 remain open and relay 72 can not be picked up to start reader 21 as described below under "Pedestal-Carriage-Return." Contacts 100-3 (Fig. 12) close. If a carriage-return signal is now sensed by reader 21, contacts 9-6 make and the pulse generated by CB-7 is directed over contacts 9-6 and 100-3 to operate solenoid 212, which returns the pedestal-carriage to its initial position.

When relay coil 99P is picked up as described above, contacts 99-1 close to pick up relay coil 99H, establishing a hold circuit for relay 99. As contacts CB-9 are operated by the main timing shaft during the read cycle, another hold circuit for 99 is set up through terminals 4/6A, 4/1A.

Relay coil 75P is energized whenever solenoid 210 (Fig. 11) is activated to index the pedestal-carriage of copy-follower 20. Accordingly, if the code encountered by reader 21 during the above read cycle is not for a character, which is defined as any code that will step the pedestal-carriage, the hold circuit for relay 99 will remain activated and reader 21 will perform another read cycle. If during this read cycle the reader senses a carriage-return code contacts 9-10 open and relay 99 drops out. The operator must then strike character-print key 36 again. If, however, during the read cycle the reader encounters the code for the first character in the word to be corrected, the sensed code is applied through converter 28 to typewriter 22. The character related to the code is then printed on the offset master and is punched in the 8-unit tape.

When timing contacts CB-5 (Fig. 11) are operated, a pulse is fed through one of the contacts represented by 7-4, 8-4...59-6, 60-4 to index solenoid 210 which advances copy-follower 20 one space. The same pulse will energize relay coil 75P. Contacts 75-2 then close, completing a hold circuit for relay 75 that includes relay coil 75H, contacts 75-2 and CB-6. Contacts 75-3 open to break one of the hold circuits through relay coil 99H; when contacts CB-9 open in the same read cycle, the second hold circuit for relay 99 is broken and 99 drops out. After this, contacts 99-3 open the circuit for clutch 202, thereby stopping reader 21. Contacts 99-4 open one of the hold circuits for relay 100 and at the proper time contacts CB-6 break the other hold circuit for this relay which then drops out. This completes one character-print cycle during which a code combination is read out of the 5-unit tape by reader 21 and the related character is printed on the offset master by typewriter 22.

The operator repeats the character-print cycle until the erroneous character in the misspelled word is reached. The code for this character on the 5-unit tape is skipped when the operator strikes character-skip key 44 (Fig. 6) and contacts 44A close to complete a circuit that energizes relay coil 99P. This will cause relay coil 99H and then relay 100 to be energizes to effect the operations described just above.

As the character-skip key 44 is struck, contacts 44B close to energize relay 98P and contacts 44A energize relay 99. Contacts 98-1 establish a hold circuit for relay 98 by completing a path through relay coil 98H and contacts CB-6, when CB-6 are operated, while contacts 98-2 establish another hold circuit for relay 98. Contacts 98-3 and 98-4 open related circuits to translator 227 so that typewriter 22 will not respond to the code read by reader 21, and the erroneous code will be skipped. Contacts 98-5 and 98-6 open to perform the same functions as contacts 100-2 and 100-3, respectively, described in this section in connection with the character-print operation.

As the copy-follower 20 indexes one space, relay 75 is energized. Contacts 75-3 open one hold circuit on relay 99, and when contacts CB-9 open the other hold circuit for 99 is broken and the relay is de-energized. Thus, contacts 75-3 determine the particular read cycle and contacts CB-9 the time in the cycle when the relay will be released. After relay 99 is de-energized contacts 99-3 open the circuit for clutch coil 202 and reader 21 stops. Contacts 99-2 open one of the hold circuits for relay 98, and when contacts CB-6 open the other hold circuit for 98 during this read cycle relay 98 drops out. Relay 100 is released in the manner indicated above.

The operator now types the character that will correct the misspelled word and depresses a start-key 45 (Fig. 11) to place reader 21 in automatic operation. When the start-key is depressed a circuit is completed to pick up relay 67 and a hold circuit is established through contacts 67-2 and normally-closed contacts 69-1. The latter contacts are related to relay 69 and are operated during each read cycle through contacts CB-1 and 250. This assures that relay 67 will remain energized until the reader has been started.

When start-key 45 is released a circuit is completed through its normally-closed contacts, contacts 67-1, the bank of contacts starting with 12-2, the bank starting with contacts 46-3 and relay 68. The latter relay is then energized and contacts 68-2 close to complete a circuit that activates clutch coil 202. The reader 21 then reads the code for the next character in the misspelled word and since a hold circuit for 68 is established through contacts 68-1 the reader continues in automatic operation.

Pedestal-Carriage Return

At the end of a line on the tear sheet, reader 21 senses two carriage-return codes and a line-feed code in the 5-unit tape. The first code causes the pedestal-carriage on copy-follower 20 to move its brushes 205 from the tear sheet and return to its initial position. During the return, reader 21 is turned off and at the conclusion of the return is restarted. After the carriage return the copy-follower automatically effects a line feed. The second carriage-return code accomplishes a line feed only while the reader is stopped and restarted. The line-feed code now executes a line feed and brushes 205 are moved to engage the tear sheet.

When reader 21 recognizes the code for a carriage return, relay 9 (not shown) is energized via a circuit in code converter 28 and a hold circuit (not shown) is established for this relay via timing contacts CB-6. Contacts 9-2 (Fig. 11) break dropping out relay 68, which opens contacts 68-2 and stops the main timing shaft of reader 21. The reader then stops.

When timing contacts CB-8 (Fig. 12) are closed a circuit is completed through closed contacts 9-4 and 73-2 to energize brush solenoid 211, which causes the pedestal to move brushes 205 away from the tear sheet. During this operation microswitch 213 closes a circuit over contacts 98-5, 100-2, 9-5, and relay 74 is picked up. Contacts 74-3 close, establishing a hold circuit for relay 74 via microswitch 213. Contacts 74-2 close so that when timing contacts CB-7 make a pulse is transmitted through closed contacts 9-6 and 74-2 to energize the pedestal-carriage return solenoid 212. When energized this solenoid causes a mechanical arrangement in the copy-follower 20 to return the pedestal-carriage to its initial position and to perform a line-feed operation.

When the pedestal-carriage is in its initial position microswitch 215 is closed and a circuit is completed through contacts 74-4 and relay 72. The latter relay is energized and a hold circuit is set up by means of contacts 72-1. Contacts 72-3 close to pick up relay 73, and contacts 73-1 create a hold circuit for this relay. Contacts 72-2 complete a circuit that includes normally-closed contacts 87-11, the bank of contacts starting with 12-2 and the bank starting with contacts 46-3 to energize relay 68. This will close contacts 68-2 to energize the clutch coil 202 to start reader 21 and another read cycle. At the same time a hold circuit is formed through contacts 68-1. When contacts CB-1 and 250 are operated relay 69 (Fig. 11) is energized and contacts 69-2 open the hold circuit for relay 72 which then drops out.

Reader 21 then recognizes the second carriage-return code, relay 9 (not shown) is re-energized and a hold circuit is established when contacts CB-6 are operated. As contacts CB-7 make a pulse is transmitted through contacts 9-6, 74-2, and carriage-return solenoid 212. The line-feed mechanism on the copy-follower 20 then provides another line feed, even though the pedestal-carriage is in its initial position. In this way the copy-follower obtains two line feeds, one for each carriage return code.

During the operation just described, contacts 73-2 were open since relay 73 was energized. Hence brush solenoid 211 was inactivated. Further, reader 21 was stopped and then restarted in the same manner as when the first carriage-return code was sensed.

In the course of the next read cycle, a line-feed code is sensed by reader 21, relay 18 (not illustrated) is picked up in converter 28, and a hold circuit is established for this relay through contacts CB-6. Contacts 18-2 (Fig. 12) open to drop out relay 73. Contacts CB-8 are operated and a pulse is transmitted over closed contacts 74-1 and 18-1 to energize solenoid 211, which causes the pedestal to place brushes 205 against the tear sheet.

After the brushes are placed against the tear sheet, reader 21 continues in automatic operation since the hold circuit through 68-1 and the bank of contacts including 92-2 keeps relay 68 energized.

In addition to energizing relay 9, the first carriage-return code noted above is converted to a space code in converter 28. When timing contacts CB-3 (Fig. 15) are operated a pulse is transmitted over a circuit that includes contacts 97-4, transferred contacts 9-1 and closed contacts 73-3 to the converter. In response to this pulse the converter sends the space code to translator 227 in typewriter 22 which then punches a space code in the 8-unit tape. When the pedestal-carriage is in its initial position, relay 73 is picked up as indicated above and contacts 73-3 open to break the line between CB-3 and converter 28. This will prevent the second carriage-return code from producing another space code in the 8-unit tape and will insure that only one space will appear between the last word of the line sensed by the copy-follower 20 and the first word of the next line.

When a space code is sensed by reader 21 contacts 12-1 make so that when timing contacts CB-3 (Fig. 15) are operated a pulse is sent through normally-closed contacts 90-1 and 112-3 to code converter 28. The converter then sends a signal to translator 227 in typewriter 22 which punches a space code in the 8-unit tape. When the space code is followed in the 5-unit tape by two carriage-return codes and a line-feed code, the first carriage-return code would normally produce a space code in the 8-unit tape in the manner just described. However, since this code was preceded by a space code relay 101 (Fig. 13) is energized as indicated above under "Stop-After-Word," and the pulse generated by CB-3 can not pass through contacts 101-3, which are open, to effect the punching of a space code in the 8-unit tape. This insures that when a carriage-return code is preceded by a space code, only one space will occur between the related words on the offset master.

If a control mark is located under the last word on a line in the tear sheet, the first letter on the next line is to be capitalized. When the line-feed code noted in this section is read, contacts 18-7 (Fig. 7) are closed and contacts CB-9, when operated, send a pulse through contacts 100-4, 110-2, normally-closed contacts 92-3, and closed contacts 96-3, 18-7 to energize relay 87. (Relay 96 is now energized since a control mark (Fig. 13) was sensed.) As the pedestal-carriage return is concluded, contacts 72-2 close as noted above and a start pulse is routed through transferred contacts 87-11, terminals 30/2B, 30/16A to the main clutch coil 202. This starts reader 21 and the letter-search operation in the capitalization routine as set forth in detail under "Cap-First-Letter-Next-Word" above.

Cap-One-Word

When word-cap key 40 is depressed reader 21 is started and typewriter 22 is shifted into upper case. Each letter in the word is then typed on the offset master in upper case. At the end of the word, the reader is stopped and the typewriter is shifted into lower case.

When the word-cap key 40 (Fig. 10) is depressed, contacts 40A and 40B close to pick up relays 110 and 111. Contacts 110-1 then complete a hold circuit through the normally-closed contacts to start key 45A and cap-start key 23b. Contacts 111-1 complete a hold circuit through contacts 88-4. When the word-cap switch is released and returns to its normal position, a circuit is formed from the 0-volts bus through closed contacts 111-2 and terminals 8/3B and 8/13A to pick up relay 87. The contacts associated with this relay effect the capitalization routine described in connection with the operation of the cap-start switch 23 under "Cap-First-Letter-Next-Word" above.

When relay 110 is activated as noted just above, contacts 110-2 transfer, directing the pulse generated by contacts CB-9 through contacts 9-11, 12-12, and 18-9 to energize relay 4. Contacts 4-2 then make to energize clutch 202 to start a read cycle, and the character for the code sensed by reader 21 during this cycle is printed in upper case on the offset master.

During each succeeding read cycle contacts CB-9 generates a pulse, and the character for the code read is typed in upper case on the offset master. When a space code is read during a read cycle contacts 12-12 break the circuit to relay 4 which drops out. Contacts 4-2 will then open the circuit for clutch coil 202 and reader 21 will stop.

The pulse generated by CB-9 during the latter cycle is directed through contacts 12-12 and 87-6 (relay 87 is energized) to pick up relay 85. This will close contacts 85-9 and 85-3 to 85-7 to shift typewriter 22 into lower case when timing contacts CB-11 are operated as previously described. After the typewriter has been downshifted the system comes to rest since contacts 100-4 (Fig. 11), which are open, prevent timing contacts CB-14 and CB-15 from sending a pulse over normally-closed contacts 87-4 and terminals 11/16B, 11/6A to energize relay 68, which would restart reader 21.

If the word to be capitalized occurs at the end of a line on the tear sheet, before the typewriter can be shifted into lower case, reader 21 encounters two carriage-return codes and a line-feed code, which are used to return the pedestal-carriage on copy-follower 20 to its initial position. The first carriage-return code energizes relay 9 (not shown) in code converter 28 and contacts 9-11 (Fig. 7) open. This prevents the pulse generated by contacts CB-9 from energizing relay 4. The code also initiates the routine that effects a pedestal-carriage return. (See "Pedestal-Carriage-Return" above.) After the pedestal-carriage has been returned to its initial position, relay 72 is energized and contacts 72-2 close. A pulse is then transmitted over transferred contacts 87-11 and terminals 30/2B, 30/16A to energize the main clutch coil 202, which starts a read cycle. The second carriage-return code is read but the pulse generated by CB-9 has no effect on relay 4 since contacts 9-11 are again open. The line-feed code is then read and relay 18 (not shown) in code converter 28 is activated. Contacts 18-9 are transferred and the pulse generated by CB-9 is directed through closed contacts 87-7 and 85-10 to activate the auxiliary clutch coil 200. This initiates a revolution of the auxiliary timing shaft. The same pulse is directed over closed contacts 87-6 to pick up relay 85. Thus, when contacts CB-11 are operated by the latter shaft a pulse is transmitted through lower case contacts 85-3 to 85-7 to translator 227 and typewriter 22 is shifted into lower case. After the termination of this revolution of the auxiliary timing shaft the system comes to rest.

In the material above when relay 87 is picked up, contacts 87-3 are closed so that when timing contacts CB-13 (Fig. 7) make relay 88 is energized. This opens contacts 88-4 to drop out relay 111. When either the start key 45 or the cap-start key 23 is struck to restart reader 21 for the next operation contacts 45B or 23B, respectively, open and relay 110 drops out.

Justification Zone

A justification zone is defined by an adjustable tab on typewriter 22. When the typewriter carriage enters this zone, the tab closes microswitch 220 (Fig. 6) and efficaciously provides a justification instruction. As soon as the next carriage-return code or space code is encountered in the 5-unit tape by reader 21, the instruction is executed. The typewriter then returns its carriage and punches a space code in the 8-unit tape. (A carriage-return code in the 5-unit tape will return the typewriter carriage only when it is in the justification zone.)

As the carriage on typewriter 22 enters the justification zone and the tab closes microswitch 220, relay 90 is energized through a circuit that includes normally-closed contacts 9-9 and 12-9. If, however, the pedestal-carriage on copy-follower 20 is being returned or if a spacing operation is in progress, contacts 9-9 or 12-9 are open and relay 90 is not energized. Because microswitch 220 remains closed as long as the typewriter carriage is in the justification zone, relay 90 is energized as soon as the foregoing operations are terminated. When relay 90 is energized, a hold circuit is established through contacts 90-4.

If the carriage of typewriter 22 were not in the justification zone and reader 21 sensed a carriage-return code, contacts 9-1 would be transferred and the pulse generated by CB-3 would be directed through normally-closed contacts 90-2 and code converter 28 to the 5-line in translator 227. This would cause the typewriter 22 to space one position and would energize the 5-magnet in the typewriter to produce a space code in the 8-unit tape.

However, in the present example the typewriter 22 is in the justification zone and relay 90 is energized. If a carriage-return code is sensed, contacts 9-1 transfer but the pulse generated by CB-3 is directed through transferred contacts 90-2 and converter 28 to the 8-line in the translator 227. This will cause the carriage of typewriter 22 to return to its initial position. At the same time, contacts 90-5 (not shown) transfer the input of the 8-magnet to the input of the 5-magnet in the typewriter which effects the perforation of a space code in the 8-unit tape.

If the carriage of typewriter 22 were not in the justification zone and reader 21 sensed a space code, contacts 12-1 would be closed and the pulse, generated by CB-3, would be directed through 12-1, normally-closed contacts 90-1 and converter 28 to the 5-line in translator 227. Typewriter 22 would then space one position and punch a space code in the 8-unit tape. If, however, the typewriter carriage is in the justification zone and a space code is sensed, the pulse will be directed through transferred contacts 90-1 and converter 28 to the 8-line in translator 227. This will cause the typewriter to return its carriage to the initial position, and since contacts 90-5 (not shown) are transferred the typewriter will punch a space code in the 8-unit tape. (A carriage-return code appears in the 8-unit tape only when manually punched at the end of a paragraph.)

Returning to our example, when relay 90 is energized, contacts 90-3 are closed. When a space or carriage-return code is encountered by reader 21, either contacts 9-8 or 12-8 make, and relay 91 (Fig. 10) is picked up by a pulse generated by contacts CB-3 and applied over a circuit that includes terminals 23/13B, 23/30A and either contacts 12-8 or 9-8. As relay 91 is energized, contacts 91-1 close a hold circuit for this relay. Contacts 91-2 open the circuit to clutch coil 202, inactivating reader 21. As the carriage of typewriter 22 is being returned in response to the carriage-return code, it leaves the justification zone and microswitch 220 open. This breaks one hold circuit for relay 90. After the carriage return has been initiated, the normally-closed carriage return contacts 183 open. This breaks the other hold circuit for relay 90, which drops out, and contacts 90-3 open to release relay 91. Then contacts 91-2 close but clutch coil 202 will not be energized since contacts 183 are still open. After the carriage return has been completed, contacts 183 close and reader 21 may be restarted.

If the operation described above started with a space code, relay 68 never dropped out. Hence clutch coil 202 will be energized over contacts 68-2 and reader 21 is restarted as soon as the carriage return contacts 183 are closed. If the operation started with a carriage return code, copy-follower 20 will execute the same routine described above under "Pedestal-Carriage Return". At the conclusion of this routine, relay 68 is energized and contacts 68-2 close. Then after typewriter 22 has executed a carriage return, contacts 183 close the circuit to coil 202 which is energized to restart reader 21.

As set forth in detail above, when the carriage of typewriter 22 is in the justification zone, relay 91 is energized when a carriage-return or space code is read by reader 21. Contacts 91-3 are then closed to pick up relay 112 and contacts 112-1 close to establish a hold circuit for the latter relay through closed contacts 113-2. Contacts 112-3 open the circuit between timing contacts CB-3 and translator 227 so that typewriter 22 will preserve the left-hand margin on the offset master in the manner that will now be described.

If during a read cycle a stop, carriage-return, space or line-feed code is read, a respective one of the contacts 6-5, 9-7, 12-7, or 18-6 is opened and the pulse generated by timing contacts CB-9 (Fig. 7) will not be transmitted over contacts 112-2, which are closed, to energize relay 113. Relay 112 will remain up and translator 227 will fail to respond to any code encountered by reader 21.

If, however, the code generated by reader 21 during a read cycle is not one of the foregoing, it must be one for a character to be printed on the offset master. None of the latter contacts will then be opened and the pulse developed by CB-9 will pick up relay 113. Normally-closed contacts 113-2 will open, releasing relay 112. Contacts 112-2 will open but since contacts 113-1 are closed relay 113 is not released until the pulse generated by CB-9 is terminated.

When relay 112 drops out, contacts 112-3 close the line between translator 227 and timing contacts CB-3, and typewriter 22 prints the character related to the code recognized by reader 21 during the read cycle. In this way the left-hand margin on the offset master is maintained and only planned indentations appear on the offset master.

Space-Prompter

The space-prompter circuits allow the system to be operated in one-word increments. More specifically, when space-prompter key 52 is struck if reader 21 is running, it will stop automatically after the next space, line-feed or hyphen code is sensed. After it is restarted, the reader processes one word and stops. Likewise, if the reader has already stopped, the space-prompter key is operated and the reader restarted. The reader will then process the codes for one word and will stop automatically.

Space-prompter key 52 (Fig. 11) is a locking-type switch that remains on until thrown manually to its off position.

Assume, as an example, that reader 21 has stopped because two control marks were sensed under the preceding word and that only the next word is to be processed. Space-prompter key 52 is then thrown to its "on" position and start key 45 (Fig. 11) is depressed to start the reader. When key 52 is in its "on" position relay 3 is energized through contacts 52A and contacts 52B open one of the parallel branches in the hold circuit for relay 68. The other branch of this circuit includes contacts 12-2, 18-4, and 36-2. One of these contacts will open after the desired word has been processed and a space, line-feed or hyphen code has been read by reader 21. Relay 68 will then drop out, contacts 68-2 will open the circuit to clutch coil 202 and reader 21 will stop.

When relay 3 is energized contacts 3-2 open the circuit between timing contacts CB-9 and relay 87. This inhibits the start of an automatic capitalization routine. (The routine could still be started through the cap-start key 23 or word-cap key 40.) Contacts 3-1 open to break the circuit to relay 92. This will prevent an automatic capitalization routine from occurring that would normally capitalize the first letter of the next word following a sentence. (See "Cap-First-Letter-Next-Word" above.)

After the reader has processed the word and stopped, the space-prompter key 52 is thrown to its normally-off position and relay 3 is released.

Mark-Skip

When several words on the tear sheet are to be deleted and the system is in automatic operation, two control marks are positioned under the word preceding and a control mark is positioned under the last word in the information to be deleted. After the two control marks have been sensed, the system stops and the operator strikes mark-skip key 56. When the mark-skip key 56 is depressed reader 21 senses the 5-unit tape and copy-follower 20 senses the tear sheet but typewriter 22 is inactivated and the information is not recorded on the offset master. This operation continues until the control mark under the last word is sensed when the reader stops at the end of the word under which the mark is located.

When the mark-skip key 56 (Fig. 10) is depressed, contacts 56A close to pick up relay 97. A hold circuit is then established through contacts 97-1 terminals 25/11A, 25/14B and the mark-reset line. Contacts 97-2 open to prevent any punctuation mark code in the 5-unit tape being skipped from starting a capitalization routine as described below under "Punctuation Marks". This is accomplished by precluding relay 92 from being energized. Contacts 97-3 open so that the system will not respond to the control mark sensed with a capitalization routine. This is accomplished when 97-3 break the circuit between relay 87 and timing contacts CB-9. (See "Cap-First-Letter-Next-Word" above.) Contacts 97-4 and 97-5 open the respective circuits between timing contacts CB-3 and CB-11 and the translator 227. This prevents the typewriter from responding to any code sensed by reader 21.

Again, as key 56 is struck, contacts 56B complete a circuit to energize relay 109. Contacts 109-1 make, establishing a hold circuit for the latter relay through terminals 20/17A, 20/15B and contacts 69-1. After reader 21 starts another read cycle contacts CB-1 and 250 are operated and relay 69 is energized. Contacts 69-1 are then opened and relay 109 drops out. The latter cycle is initiated after key 56 is released and returned to its normal position when a circuit is completed through contacts 56B and 109-2 to activate relay 68, which starts the reader.

When the mark-sense brushes 205 (Fig. 13) sense the control mark under the last word to be deleted, relay 96 is energized and contacts 96-5 open one of the parallel branches in the hold circuit for relay 68. When reader 21 encounters either a space, line-feed or hyphen code then either contacts 12-2, 18-4, or 36-2, respectively, open the other branch in this hold circuit. Relay 68 then drops out and the reader 21 stops. At the same time either contacts 12-3, 18-5, or 36-3 (Fig. 9) open the mark-reset line and relay 97 is released.

Punctuation Marks

After the code for a punctuation mark is sensed by reader 21, it is stored in upper-case circuit 59, the reader is stopped, typewriter 22 is shifted into upper case, and the code in 59 is read out to operate the typewriter. The typewriter is then shifted into lower case and reader 21 is restarted.

The punctuation marks are noted in Fig. 9 over their related contacts. When, for example, the code for an apostrophe is read relay 42 (not shown) is picked up in code converter 28 and contacts 42-1 (Fig. 9) close. Relay coil 86P is then energized and contacts 86-1 close to establish a hold circuit through relay coil 86H when timing contacts CB-6 are operated by the main timing shaft during the time interval illustrated in Fig. 16. Contacts 42-2 (Fig. 8) close to energize relay 81 and contacts 81-1 establish a hold circuit for this relay via normally-closed contacts CB-14.

When relay 86 is picked up, contacts 86-2 to 86-6 make so that when timing contacts CB-3 are operated by the main timing shaft in the time interval in Fig. 16 a pulse is transmitted through these contacts to translator 227, shifting typewriter 22 into upper case. Contacts 86-8 to 86-10 open to avoid the occurrence of back circuits in the translator.

Normally-closed contacts 42-3 (Fig. 11) open to break the hold circuit for relay 68 which drops out. Contacts 68-2 then open the circuit to clutch coil 202 and reader 21 stops. During the read cycle relay 42 is released and contacts CB-6 open the hold circuit for relay 86.

During the present read cycle contacts CB-9 (Fig. 7) are operated and a pulse is transmitted over the bank of contacts that start with 5-2 and through transferred contacts 86-7 to pick up relay 83. Contacts 83-1 create a hold circuit for 83. Contacts 83-2 make to energize clutch coil 200 and the auxiliary timing shaft starts a revolution. Since contacts 81-2, 81-3, and 81-4 are closed when contacts CB-11 are operated by the auxiliary timing shaft in the time interval shown in Fig. 16, a pulse is applied in parallel to channels 2, 3, and 5 in translator 227 and the typewriter 22 prints an apostrophe on the offset master. As contacts CB-14 and CB-15 are operated the normally-closed contacts CB-14 open to break the hold circuit for relay 81 which drops out, and a pulse is directed over CB-14, CB-15 and transferred contacts 83-3 to energize relay 85. Since relay 83 is energized a hold circuit for 85 is formed via contacts 85-1and 83-4.

Because relay 83 is still held up, contacts 83-2 remain closed and coil 200 remains energized. For this reason another revolution of the auxiliary timing shaft is initiated. During this revolution, contacts CB-11 direct a pulse via transferred contacts 85-9 and contacts 85-3 to 85-7 to translator 227, shifting the typewriter 22 into lower case. Since contacts 85-2 are closed the pulse generated by CB-13 activates relay 84. Contacts 84-1 then open and relay 83 is de-energized. Thereafter contacts 83-2 open the circuit to clutch coil 200 and the auxiliary timing shaft comes to rest. Contacts 83-3 transfer, breaking the hold circuit for relay 85 which is inactivated. Contacts CB-14 and CB-15 are then operated and a pulse is transmitted through normally-closed contacts 83-3, 87-4, and terminals 11/16B, 11/6A to energize relay 68. Contacts 68-2 then make and clutch coil 202 is energized to restart reader 21.

It will be understood from the drawings that when the code combinations representing the other punctuation marks in Figs. 9 and 14 are sensed by reader 21, operations similar to those just described will be effected to print the marks on the offset master.

When a punctuation mark, e.g., a parenthesis, appears before a letter to be capitalized the following routine is executed. The cap-start key 23 (Fig. 6) is depressed and when released relay 77 is picked up. (See "Cap-First-Letter-Next-Word" above.) Contacts 77-2 through 77-6 are then closed and typewriter 22 is shifted into upper case. At this point reader 21 is searching for the letter to be capitalized. Before the code for the letter is found the reader encounters the code for the punctuation mark, in this example a parenthesis. Normally when the latter code is sensed relay 86 is picked up as noted above in this section and contacts 86-2 to 86-6 cause typewriter 22 to be shifted into upper case. Here however relay 87 is energized during the capitalization routine and contacts 87-8 open the circuit to the latter contacts. This prevents the typewriter from punching a redundant upper case or shift code in the 8-unit tape. At the same time the code for the parenthesis is stored on the contacts related to relay 78 (Fig. 14), and the pulse generated by CB-9, is directed over transferred contacts 86-7 and 87-9 to auxiliary clutch coil 200. This permits the auxiliary timing shaft to make one revolution during which the parenthesis code stored on the above contacts are sent through translator 227 to typewriter 22 and the parenthesis is printed on the offset master. Toward the end of the revolution contacts CB-14 and CB-15 are operated and a pulse is sent through normally-closed contacts 83-3 and 87-4 to energize clutch coil 202. This activates the main timing shaft and places reader 21 back in the letter-search operation.

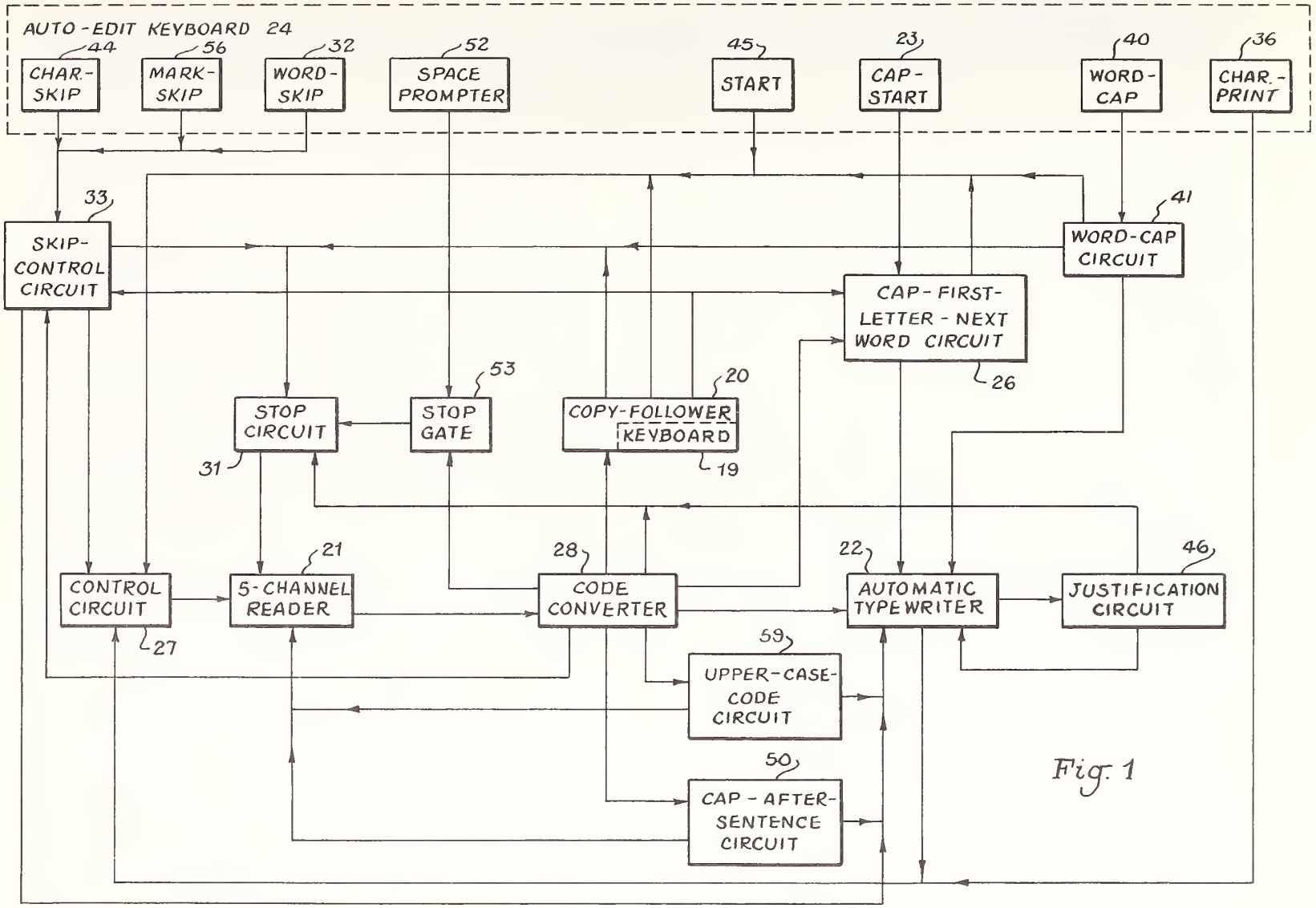

AUTO-EDIT KEYBOARD 24
CHAR.-SKIP
44
MARK-SKIP
56
WORD-SKIP
32
SPACE PROMPTER
52
START
45
CAP-START
23
WORD-CAP
40
CHAR.-PRINT
36
SKIP-CONTROL CIRCUIT
33
WORD-CAP CIRCUIT
41
CAP-FIRST-LETTER-NEXT WORD CIRCUIT
26
STOP CIRCUIT
31
STOP GATE
53
COPY-FOLLOWER KEYBOARD
19
20
CONTROL CIRCUIT
27
5-CHANNEL READER
21
CODE CONVERTER
28
AUTOMATIC TYPEWRITER
22
JUSTIFICATION CIRCUIT
46
UPPER-CASE-CODE CIRCUIT
59
CAP-AFTER-SENTENCE CIRCUIT
50

Fig. 1

31

Page 32

is blank.

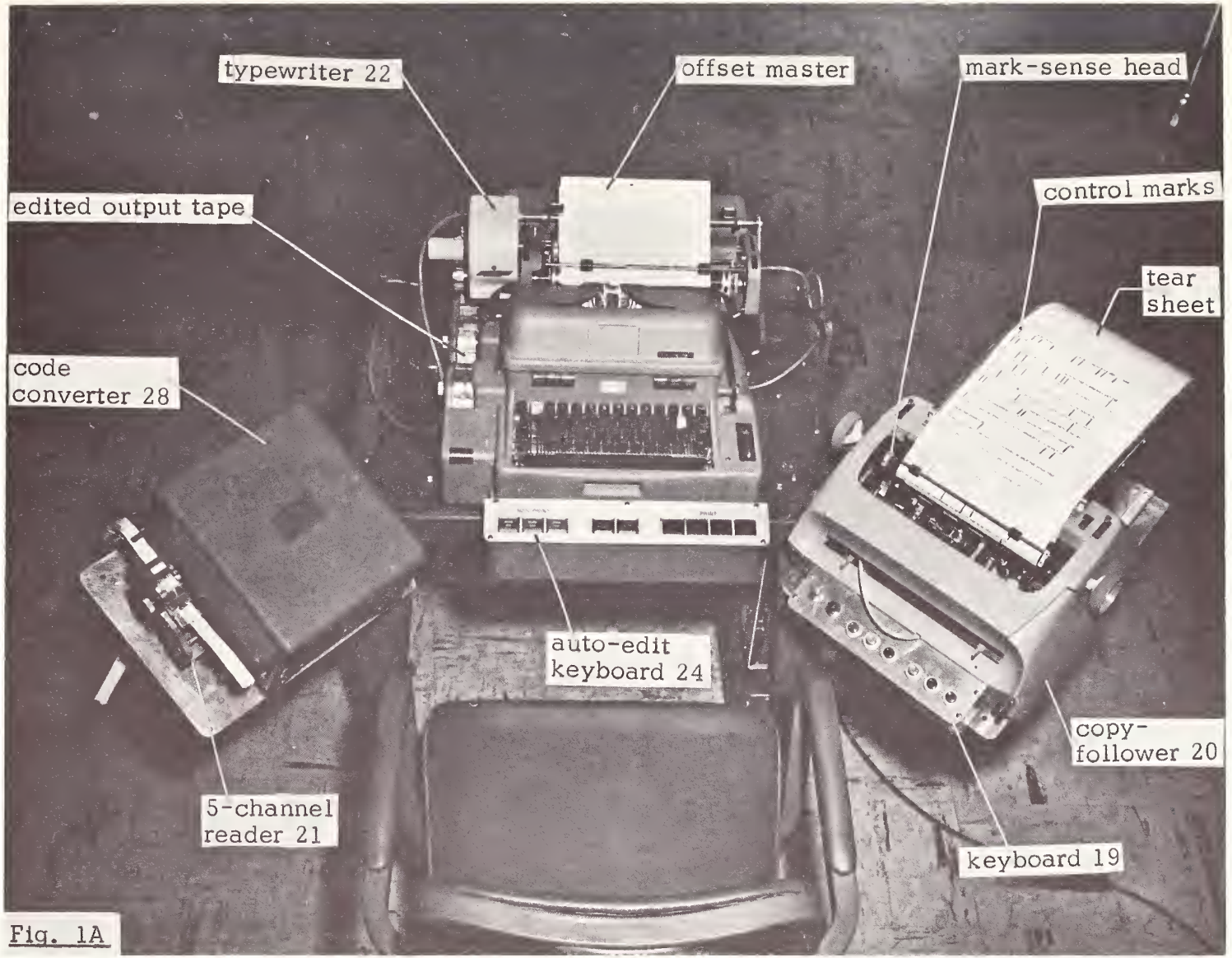

typewriter 22
offset master
mark-sense head
edited output tape
control marks
tear sheet
code converter 28
auto-edit keyboard 24
copy-follower 20
5-channel reader 21
keyboard 19

Fig. 1A

~~(TEXT)~~ CAIRO--UNDER THE TITLE, "THE MINISTER'S ROMANCES AND THE GOVERNMENT CRISIS, "EL-FINO PRESS SAYS THAT THE ROMANTIC RELATIONS WHICH CHRISTINE KEELER HAD CONCURRENTLY WITH THE RESIGNING BRITISH WAR SECRETARY AND THE FORMER SOVIET MILITARY ATTACHE IN LONDON MAY SEEM TO BE THE CAUSE OF THE PRESENT VIOLENT CRISIS FACING THE MACMILLAN GOVERNMENT, A CRISIS WHICH IS ABOUT TO CAUSE THE TORIES TO LOSE THE POWER THEY TWICE COMMANDED AS A RESULT OF

~~LPAGE TWO RUQVLS 44~~

GENERAL ELECTIONS. IN FACT, THIS SCANDAL IS ONLY THE STRAW THAT BROKE THE CAMEL'S BACK, BECAUSE IT CAME IN THE WAKE OF A SERIES OF OTHER CRISES WHICH HAD A GREAT EFFECT IN WEAKENING THE POSITION OF THE TORIES AND IN DISCREDITING THEM, BOTH ON THE LOCAL BRITISH AND WORLD LEVELS.

Fig. 2

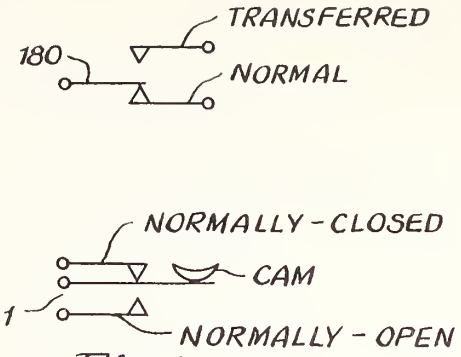


Fig. 3

FIG. 6
FIG. 7
FIG. 8
FIG. 9
FIG. 10
FIG. 11
FIG. 12
FIG. 13
FIG. 14
FIG. 15

Fig. 4

2	7B	24B			
3	12B	4A			
4	4B	2A		4A	
67	17A	17A			
68	17A	2A			
69	17A	20A	20A	4A	
70	21A	25A	29A	17B	
71	17B	20A		11A	
72	19A	16A	19A		
73	19A	20B	29A		
74	20B	19B	19A	20A	
75		16A	0A		

76	22B					
77	6B	28B	28B	28B	27B	27B
78	8B	27B	27B	26B		
79	8B	26B				
80	8B	26B	26B	26B		
81	8B	25B	25B	25B		
82	7B	25B				
83	5B	6B	6A	6A		
84	5B	3A	3B			
85	6A	4B	27A	27A	26A	26A
	26A	26A		26A	6B	

Fig. 5A

86	10B	30B	30B	30B	29B
	29B	5B	27B	25B	25B
87	3A	2B	3B	6A	6A
	6A	6B	30A	5B	5A
	16B				
88	3B	2B	5B	12A	
89	7B	25B	24B	24B	
90	28A	29A	13B	2A	
91	12B	2A	9A		
92	12B	17B	5A	4A	
93	22B		23B		
94	21B	23B	22B	22B	24A
95	22B	21B	4A		
96	22B	21B	5A	22B	17B
	4B				
97	14B	12B	4A	29A	25A
98	0A	0A	29A	25A	18A
	19B				
99	0A	0A	2B	10A	
100	10A	18A	19B	6A	
101	23A	24B	29A		
102	24A	22A	22A		
103	23A	23B	19B		
104	22B	21B			
105	21B		23A		
106	22A		23A		
107	23A	23B	23A		
108	23A	22A			
109	15B	15B			
110	14A	6A		16B	
111	13A	13A			
112	9A	5B	29A		
113	5B	9A			
114	23B				

Fig. 5B

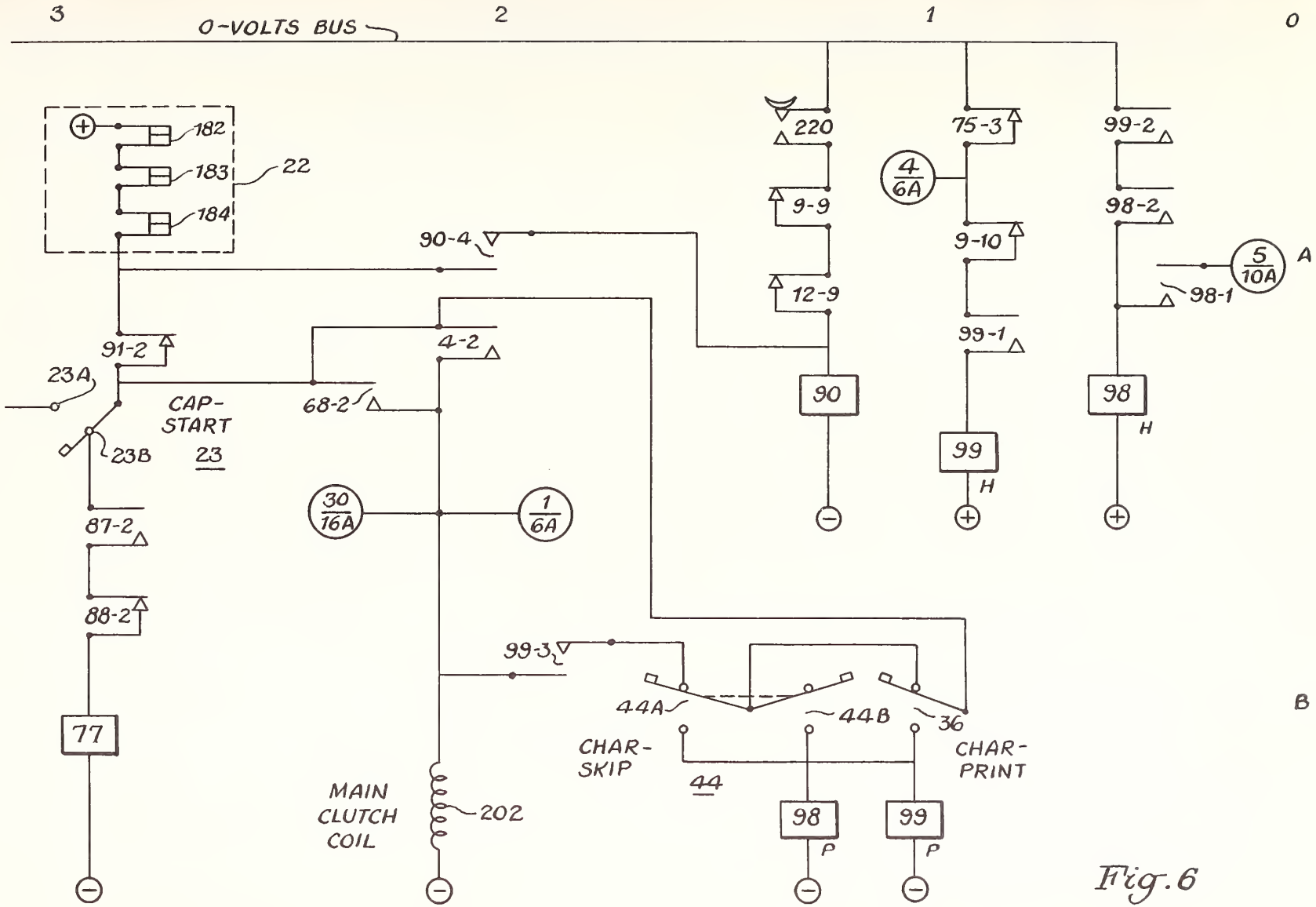

3
0-VOLTS BUS
2
1
0
182
183
184
22
220
9-9
12-9
90
75-3
4/6A
9-10
99-1
99
H
99-2
98-2
5/10A
A
98-1
98
H
90-4
91-2
23A
CAP-START
23
23B
68-2
4-2
30/16A
1/6A
87-2
88-2
77
99-3
44A
44B
36
CHAR-SKIP
44
CHAR-PRINT
98
P
99
P
MAIN CLUTCH COIL
202
B

Fig. 6

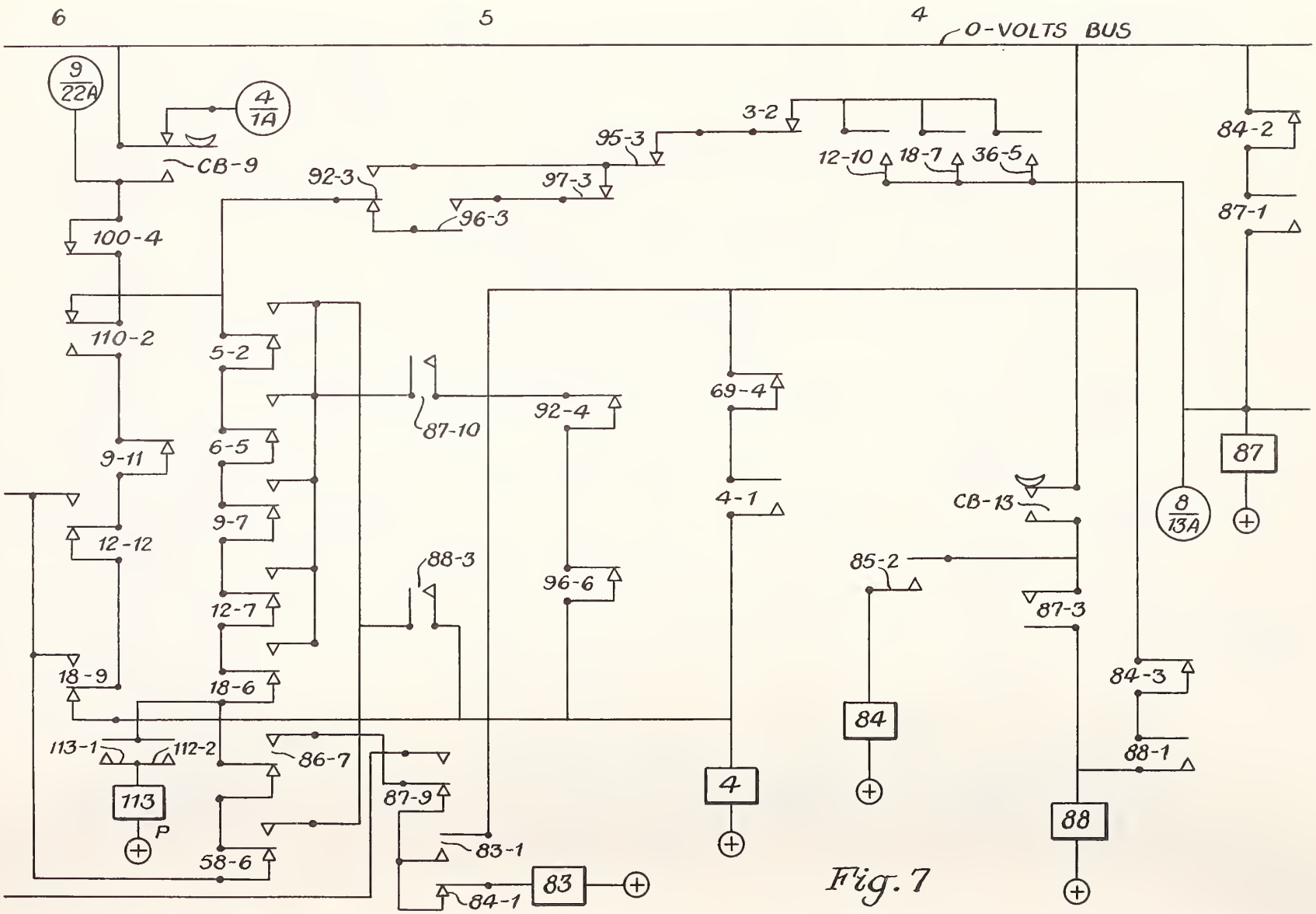

6
5
4
0-VOLTS BUS
9/22A
4/1A
CB-9
100-4
110-2
9-11
12-12
18-9
113-1
112-2
113
P
58-6
5-2
6-5
9-7
12-7
18-6
86-7
87-9
83-1
84-1
83
87-10
88-3
92-3
95-3
97-3
96-3
3-2
12-10
18-7
36-5
92-4
96-6
69-4
4-1
4
84-2
87-1
87
8/13A
CB-13
85-2
87-3
84
84-3
88-1
88

Fig. 7

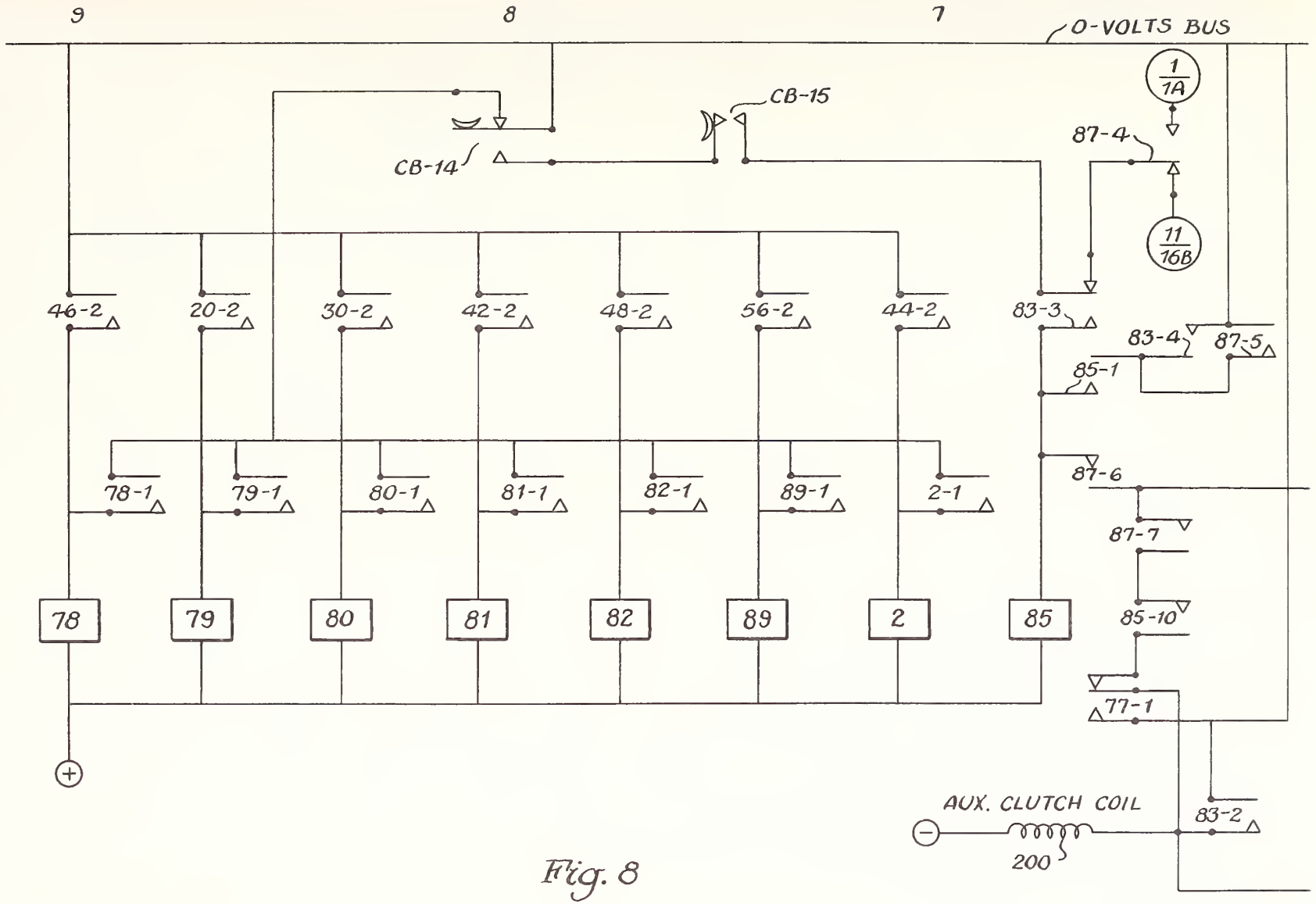

9
8
7
0-VOLTS BUS
1
1A
CB-15
CB-14
87-4
11
16B
46-2
20-2
30-2
42-2
48-2
56-2
44-2
83-3
83-4
87-5
85-1
87-6
78-1
79-1
80-1
81-1
82-1
89-1
2-1
87-7
78
79
80
81
82
89
2
85
85-10
77-1
AUX. CLUTCH COIL
83-2
200

Fig. 8

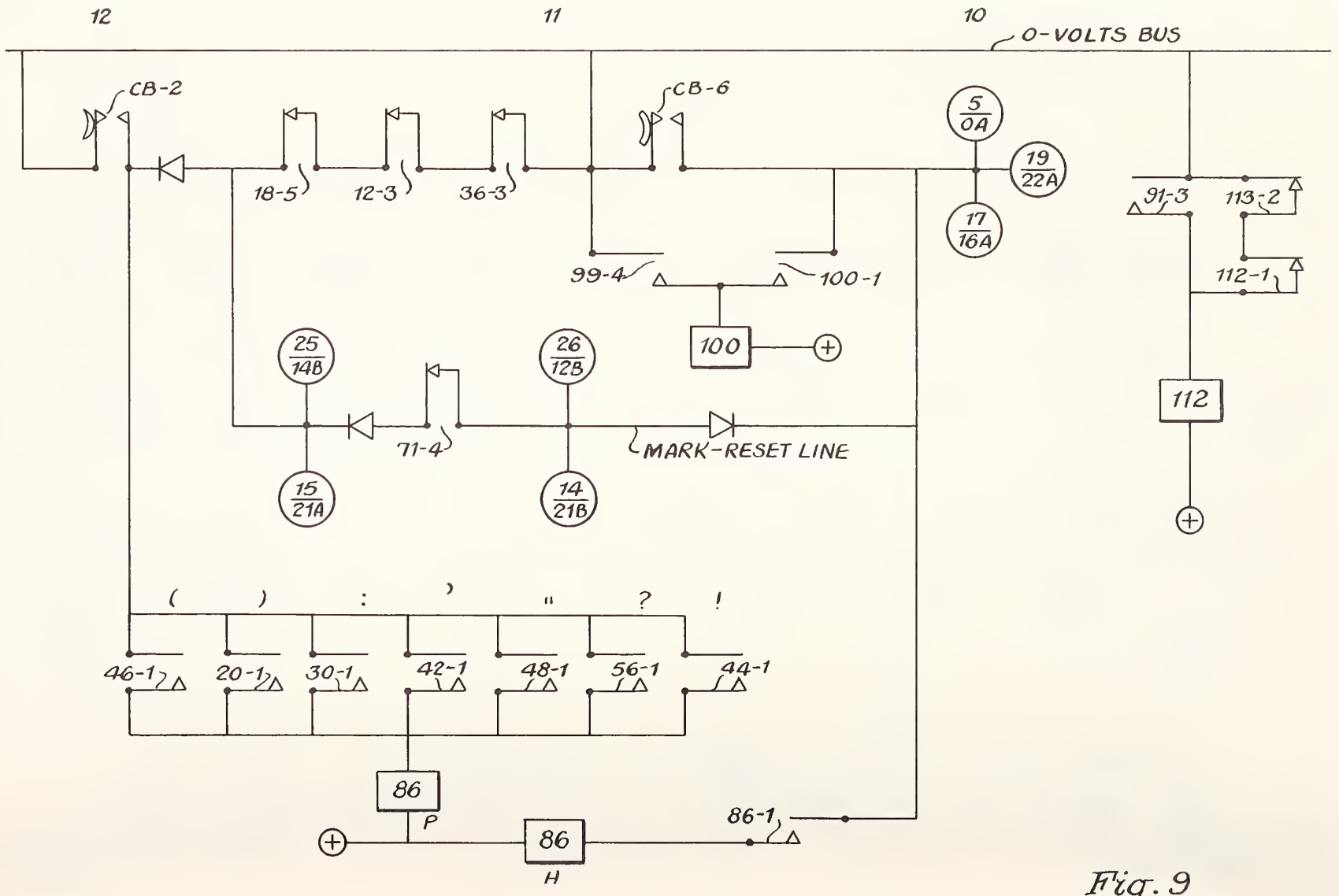

12
11
10
0-VOLTS BUS
CB-2
CB-6
18-5
12-3
36-3
99-4
100-1
100
5/0A
19/22A
17/16A
91-3
113-2
112-1
112
25/14B
26/12B
71-4
MARK-RESET LINE
15/21A
14/21B
( ) : ' " ? !
46-1
20-1
30-1
42-1
48-1
56-1
44-1
86
P
86
H
86-1
40

Fig. 9

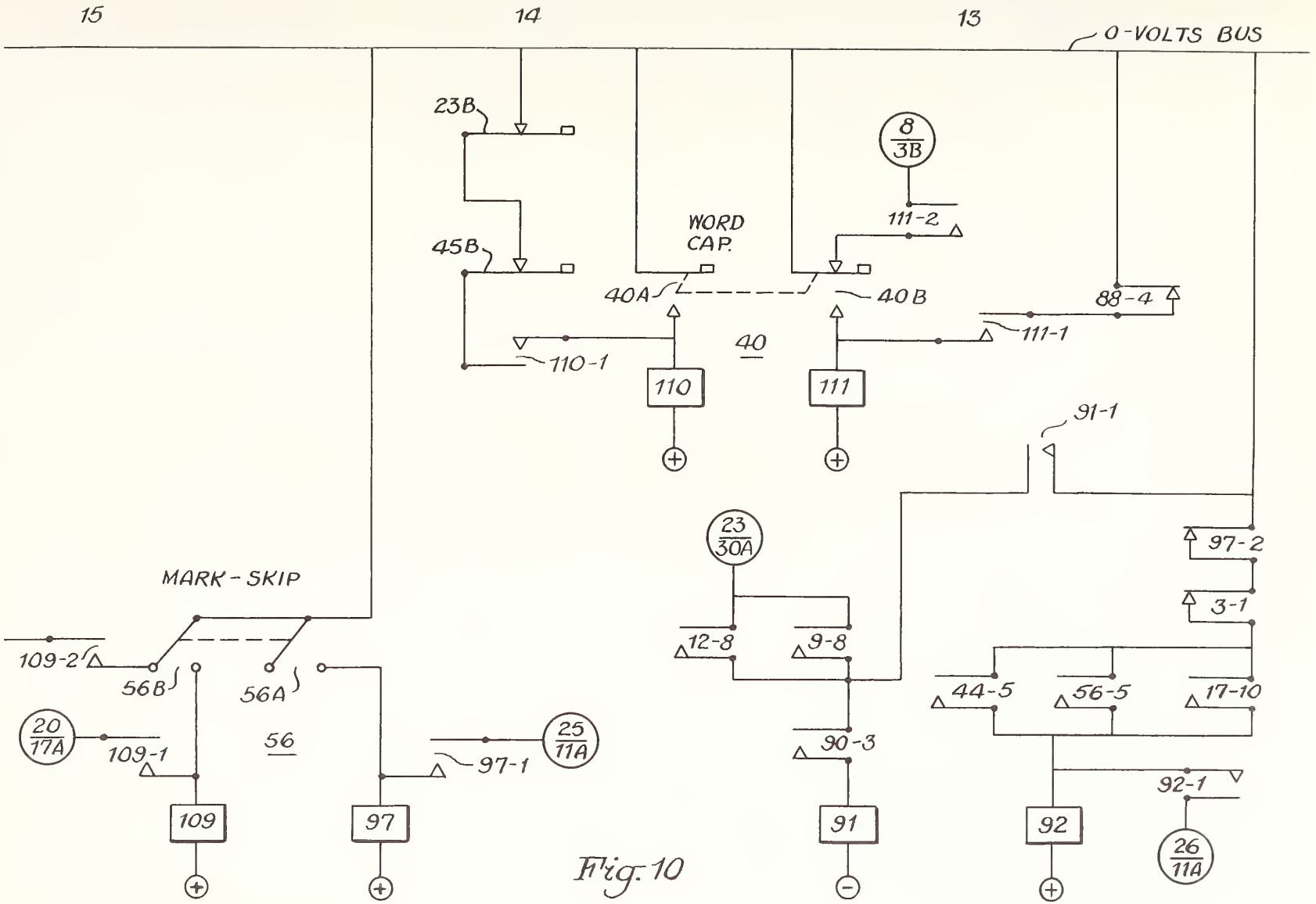

15
14
13
0-VOLTS BUS
23B
45B
8/3B
111-2
WORD CAP.
40A
40B
88-4
111-1
110-1
40
110
111
91-1
MARK-SKIP
109-2
56B
56A
20/17A
109-1
56
25/11A
97-1
109
97
23/30A
12-8
9-8
90-3
91
97-2
3-1
44-5
56-5
17-10
92-1
92
26/11A
41

Fig. 10

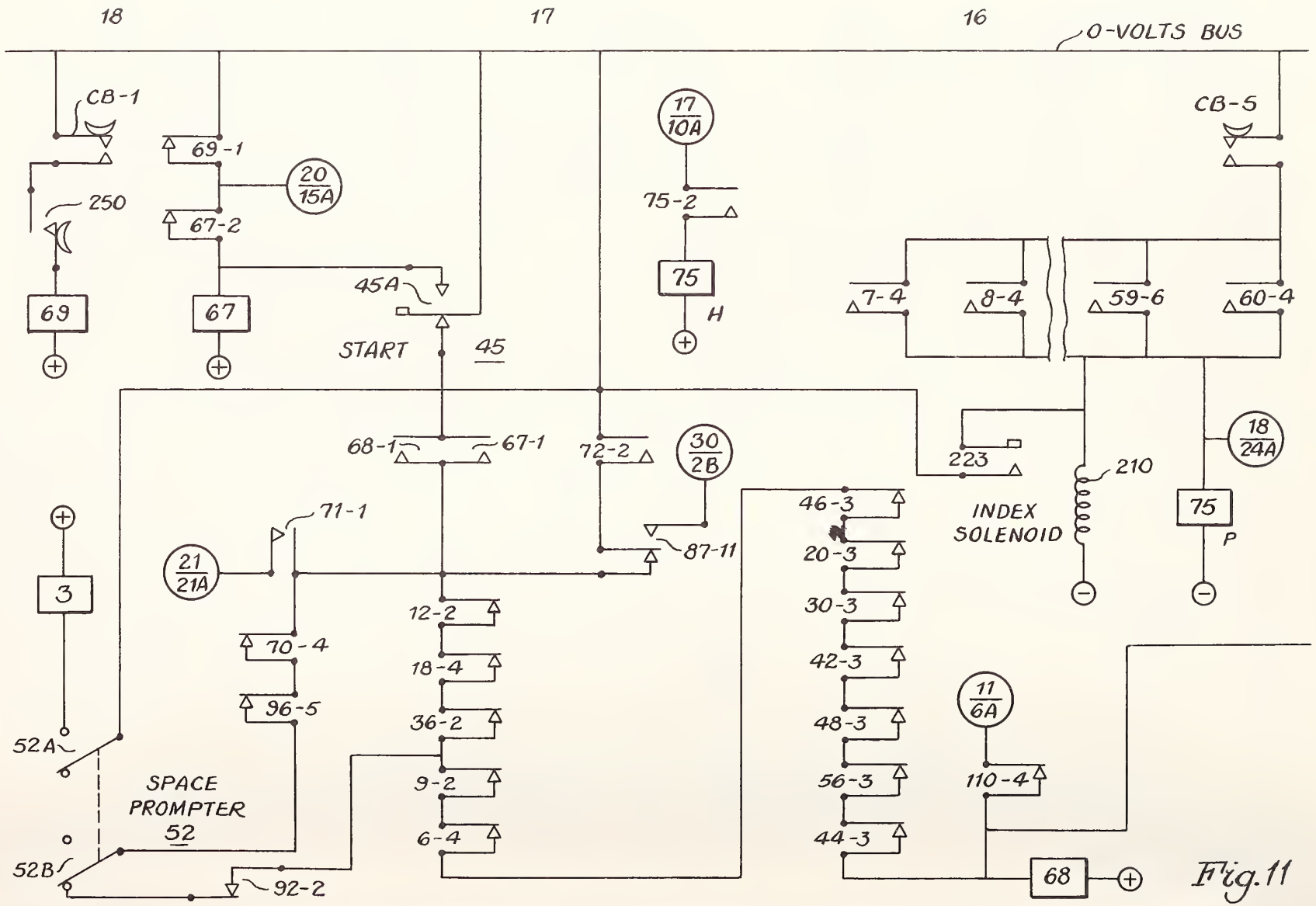

18
17
16
0-VOLTS BUS
CB-1
250
69
69-1
20/15A
67-2
67
45A
START 45
17/10A
75-2
75
H
CB-5
7-4
8-4
59-6
60-4
68-1
67-1
72-2
30/2B
87-11
223
210
INDEX SOLENOID
18/24A
75
P
3
71-1
21/21A
70-4
96-5
12-2
18-4
36-2
9-2
6-4
46-3
20-3
30-3
42-3
48-3
56-3
44-3
11/6A
110-4
68
52A
52B
SPACE PROMPTER 52
92-2
42

Fig. 11

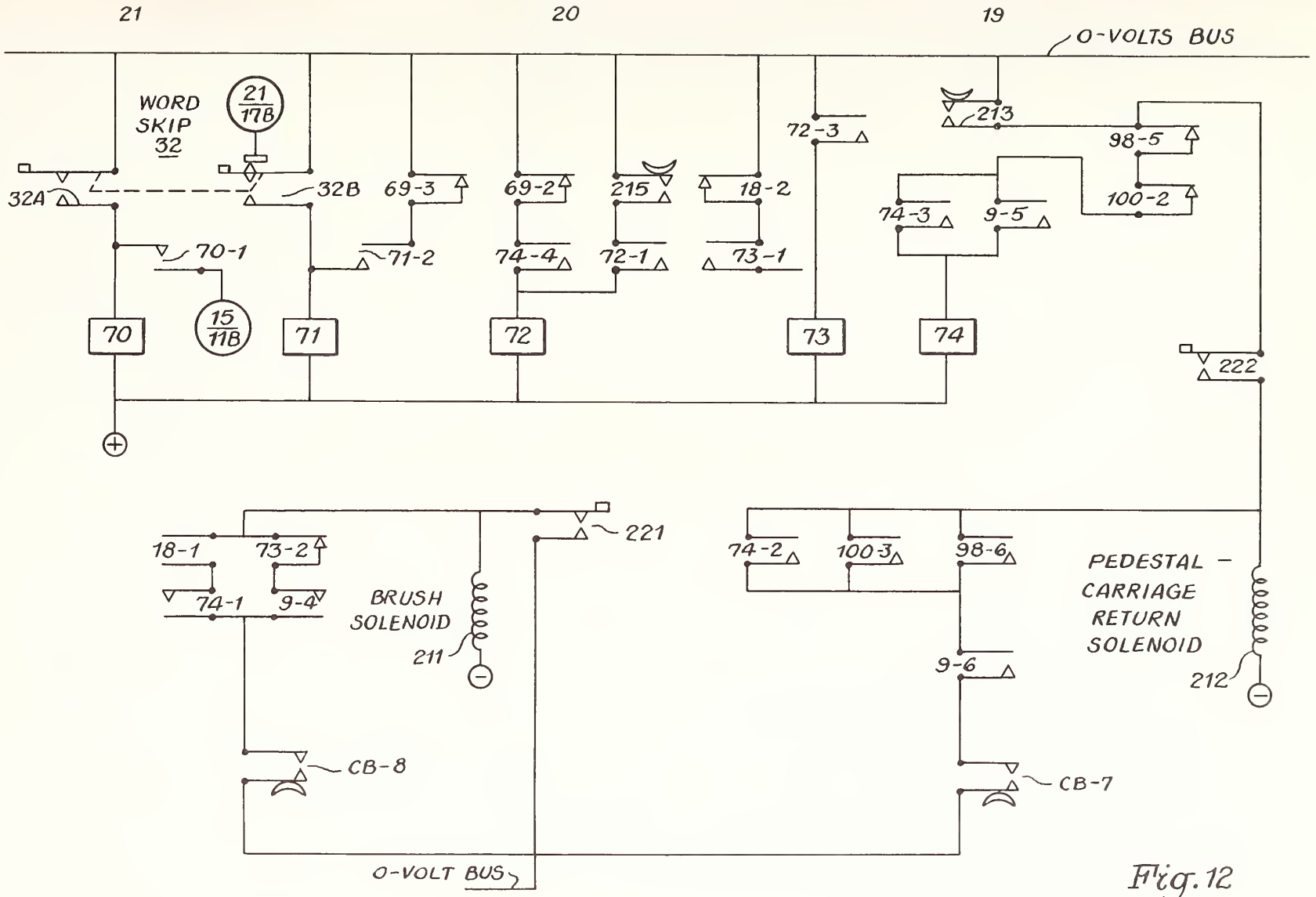

21
20
19
0-VOLTS BUS
WORD SKIP 32
21/178
32A
32B
69-3
69-2
215
18-2
72-3
213
98-5
100-2
74-3
9-5
70-1
71-2
74-4
72-1
73-1
15/118
70
71
72
73
74
222
18-1
73-2
74-1
9-4
BRUSH SOLENOID
211
221
74-2
100-3
98-6
9-6
PEDESTAL - CARRIAGE RETURN SOLENOID
212
CB-8
CB-7
0-VOLT BUS

Fig. 12

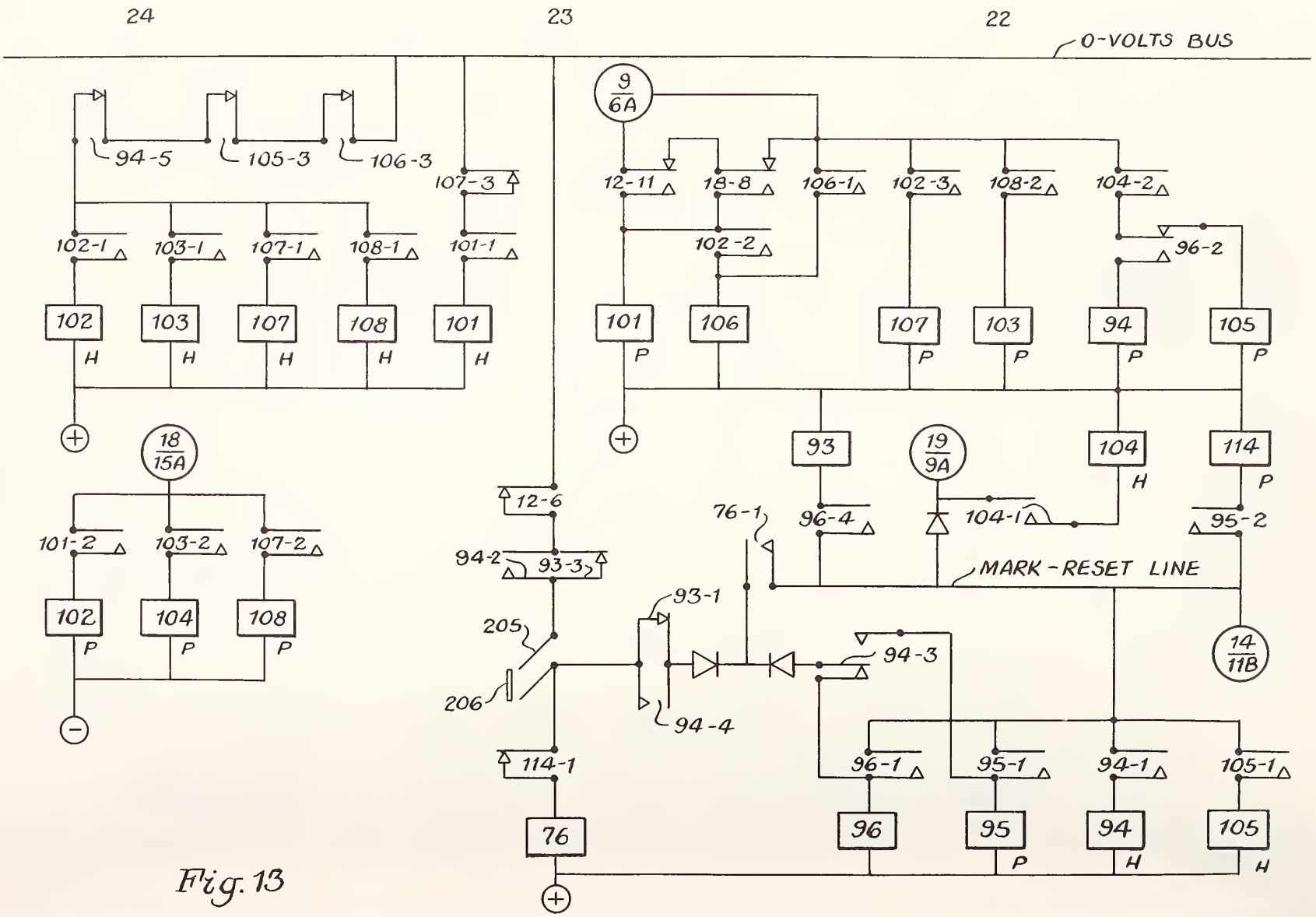

24
23
22
0-VOLTS BUS
94-5
105-3
106-3
107-3
102-1
103-1
107-1
108-1
101-1
102
103
107
108
101
H
18/15A
101-2
103-2
107-2
102
104
108
P
9/6A
12-11
18-8
106-1
102-3
108-2
104-2
102-2
96-2
101
106
107
103
94
105
P
93
19/9A
104
114
H
P
12-6
76-1
96-4
104-1
95-2
94-2
93-3
MARK-RESET LINE
93-1
205
206
94-3
14/11B
94-4
114-1
96-1
95-1
94-1
105-1
76
96
95
94
105
P
H

Fig. 13

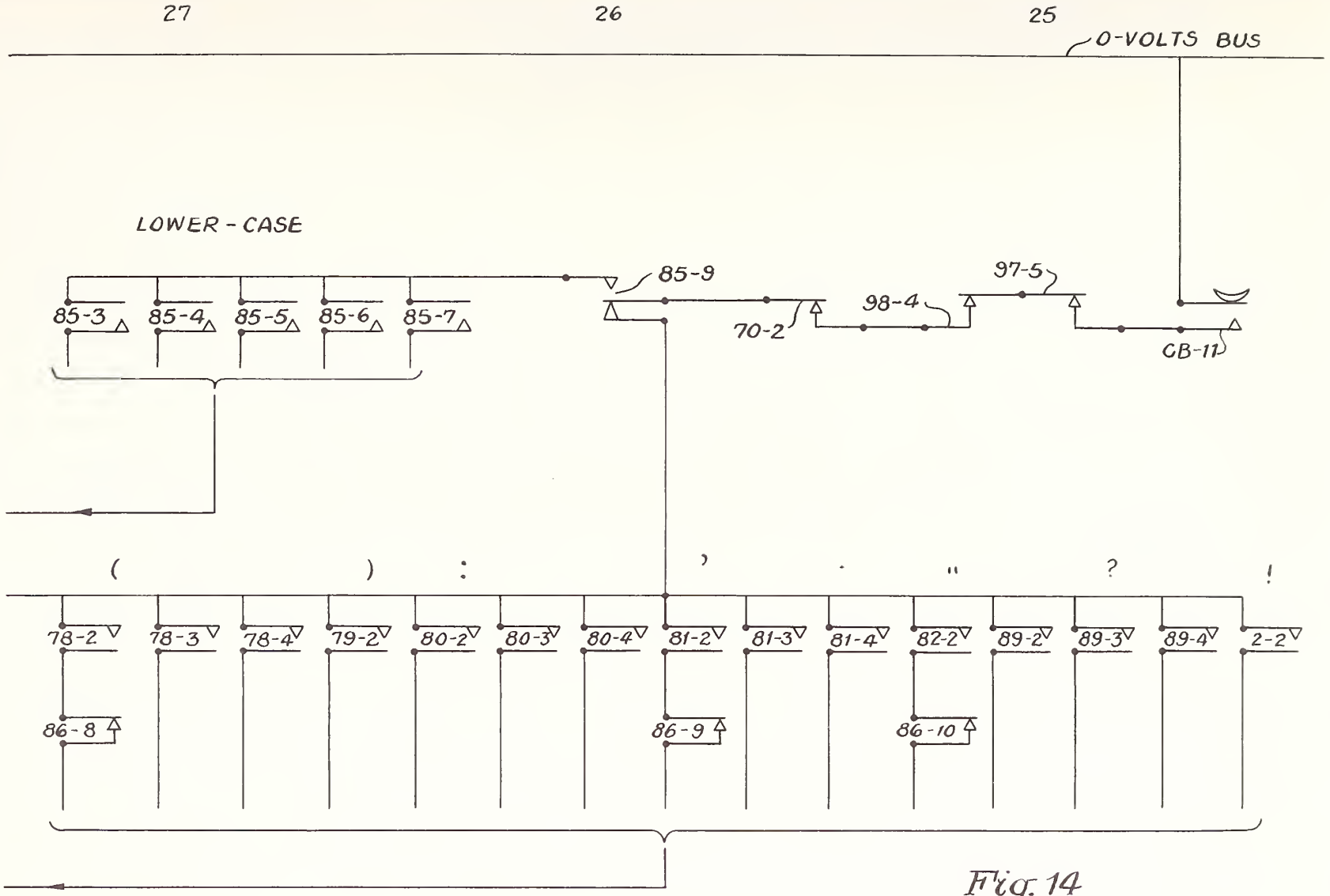

27
26
25
0-VOLTS BUS
LOWER - CASE
85-3
85-4
85-5
85-6
85-7
85-9
70-2
98-4
97-5
GB-11
( ) : ' . " ? !
78-2
78-3
78-4
79-2
80-2
80-3
80-4
81-2
81-3
81-4
82-2
89-2
89-3
89-4
2-2
86-8
86-9
86-10

Fig. 14

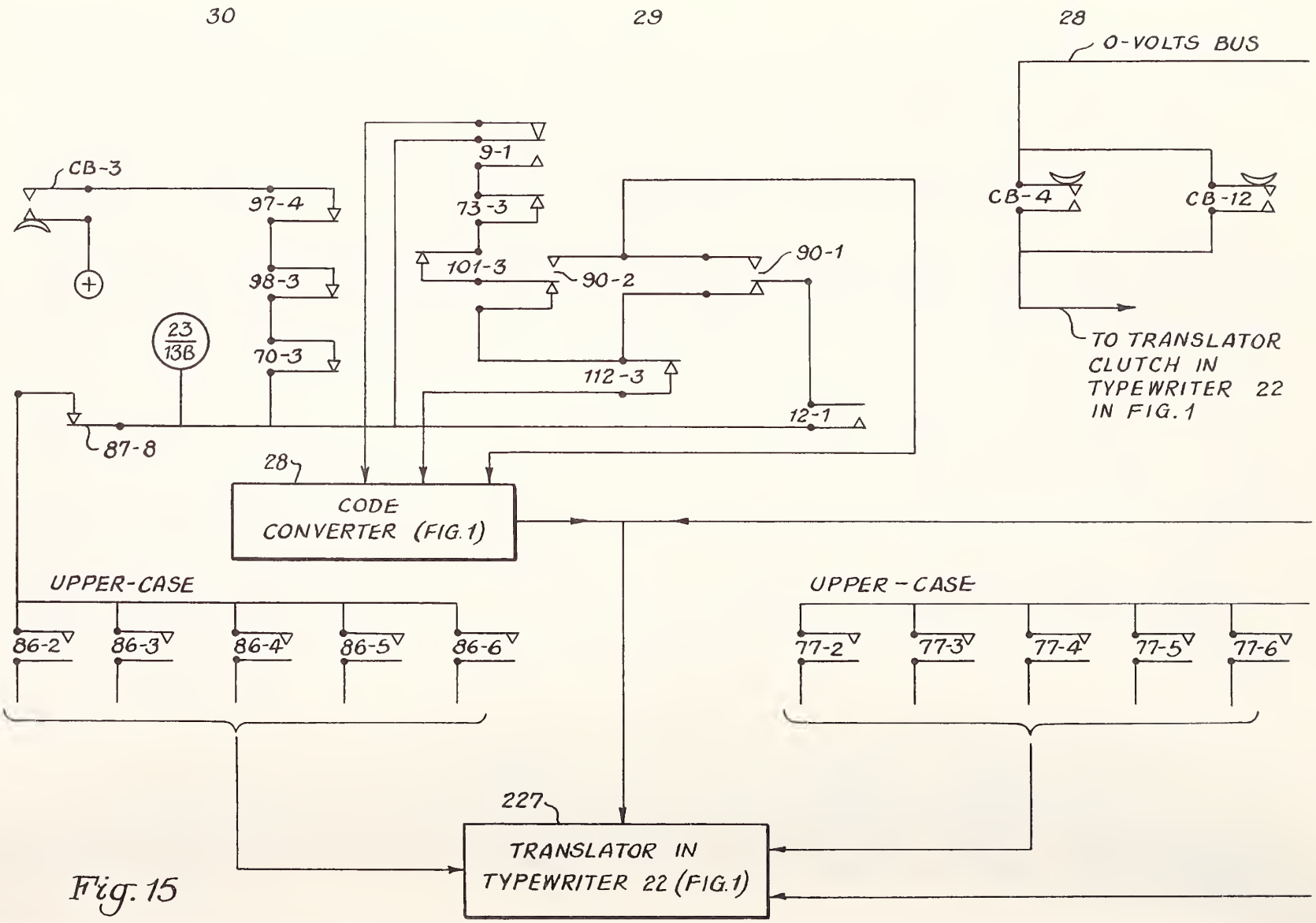
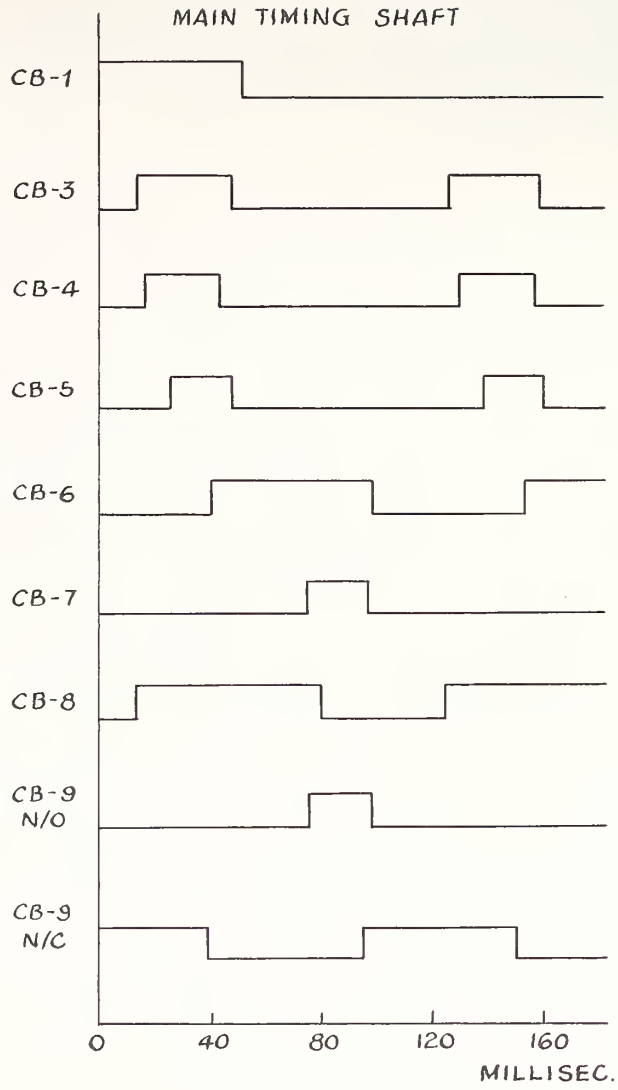

30
29
28
0-VOLTS BUS
CB-4
CB-12
TO TRANSLATOR CLUTCH IN TYPEWRITER 22 IN FIG. 1
CB-3
97-4
98-3
70-3
23/13B
9-1
73-3
101-3
90-2
90-1
112-3
12-1
87-8
28
CODE CONVERTER (FIG. 1)
UPPER-CASE
86-2
86-3
86-4
86-5
86-6
UPPER-CASE
77-2
77-3
77-4
77-5
77-6
227
TRANSLATOR IN TYPEWRITER 22 (FIG. 1)

Fig. 15


MAIN TIMING SHAFT
CB-1
CB-3
CB-4
CB-5
CB-6
CB-7
CB-8
CB-9 N/O
CB-9 N/C
0
40
80
120
160
MILLISEC.

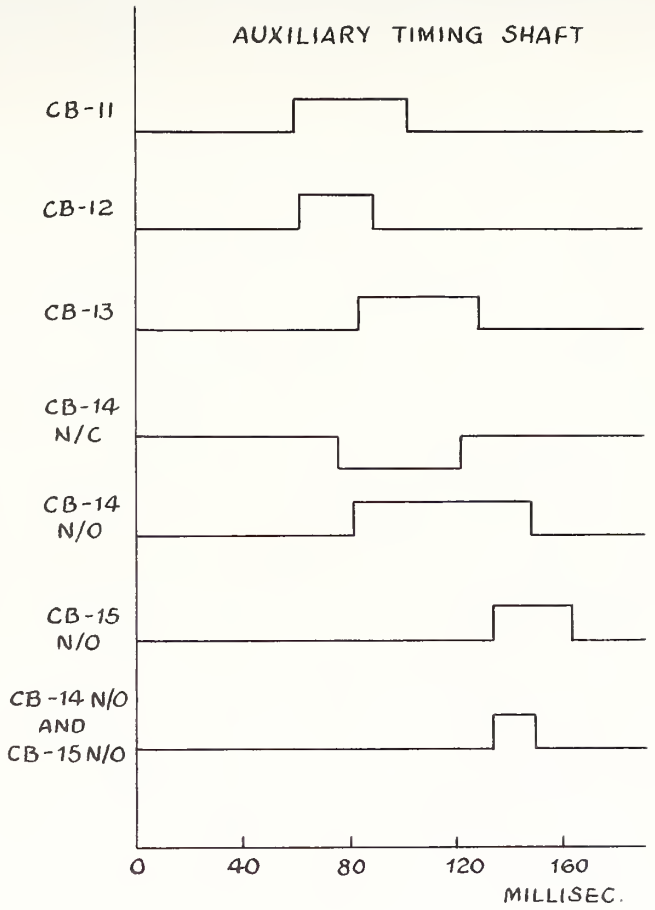

AUXILIARY TIMING SHAFT
CB-11
CB-12
CB-13
CB-14 N/C
CB-14 N/O
CB-15 N/O
CB-14 N/O AND CB-15 N/O
0
40
80
120
160
MILLISEC.

Fig. 16

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